# NetworkWorld

## THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

# ACTIVEX MARKS NEW VIRUS SPOT

**By Ellen Messmer and Carol Sliwa**

Like many companies, Lockheed Martin Corp. has come to rely on Microsoft Corp. technology. But when it comes to Lockheed's intranet, one thing the company will not abide is ActiveX, a cornerstone of Microsoft's Web efforts.

The reason? ActiveX can offer virus writers and hackers a perfect network entree. "You can download an ActiveX applet [that is] a virus, which could do major damage," explains Bill Andiario, technical lead for Web initiatives at Lockheed Martin Enterprise Information Systems, the company's information systems arm. "Or it could go in and grab your proprietary information and pass that back to a competitor, or worse yet, another country."

*See ActiveX, page 75*

**Security concerns** about ActiveX technology make Lockheed's Bill Andiario "a little hesitant" to use Internet Explorer.

EUGENE MOPSIK

## Directory standard delayed

**By Christine Burns**

LDAP — the current darling of vendors building directory services into their products — is in danger of losing some of its allure because of bickering within the IETF.

Version 3.0 of the Lightweight Directory Access Protocol (LDAP), which is expected to include better security and enhanced server-to-server communications, was supposed to be well along the standards track by December. But the Internet Engineering Task Force working group charged with moving the standard forward has been delayed by infighting that could push back standardization of Version 3.0 — and subsequent

*See LDAP, page 12*

# Browsers are late

*'Internet time' slows as Netscape and Microsoft struggle to release new browsers.*

**By Carol Sliwa**

The rate at which Microsoft Corp. and Netscape Communications Corp. crank out new Web browser editions — dubbed "Internet time" by some observers — appears finally to be slowing down.

The companies — which over the past year have been releasing new browser versions at the frenetic pace of every three to six months — missed year-end release dates for their respective Version 4.0 browsers. Netscape last week confirmed a delay until the second quarter, and Microsoft, which has yet to ship its beta, is now talking about a June or midsummer general release.

Why the delays? Their browsers are no longer lean, but rather rival operating systems and application suites in scope. Both Netscape and Microsoft — in an effort to match and outdo each other — are launching ambitious new versions with more complicated features that can require more time to build and longer testing periods. Netscape's new browser, for instance, is only one component of a Communicator groupware client that includes E-mail, collaboration tools and Web authoring functionality.

Given that Version 3.0 browsers shipped last August, nearly a year will have passed before the next incarnations hit the streets. One might expect customers to be upset about the companies delivering products later than originally planned, but just the opposite is true.

"Praise the Lord" was the reaction from John Pike, the Washington, D.C.-based Web-

*See Browsers, page 76*

### ANDREESSEN FACES GATES IN BROWSER RACE

**Netscape Navigator**

| Version 1 | V.2 | V.3 | V.4 |
|---|---|---|---|
| 1994 | 1995 | 1996 | 1997 |

**Microsoft Internet Explorer**

V.4

**V.1** (Windows 95 and NT)    **V.2** (Windows 95 and NT)    **V.3** (Windows 95 and NT)

**V.2** (Windows 3.1)    **V.3** (Windows 3.1)

## Lean, mean surfin' machine

**By Todd Wallack**

With Netscape Communications Corp. and Microsoft Corp. each spending millions to create the world's greatest browser, the last thing you would expect is for a couple of independent programmers to take them on.

But that is just what two guys from Norway are doing.

**Von Tezchner**

Jon von Tezchner and Geir Ivarsoy, who started working on their browser in 1994, insist their Opera browser has one major advantage the Big Two don't: restraint.

While Netscape and Microsoft try to one up each other with

*See Opera, page 75*

## NC server code lags devices

**By John Cox**

Today, you can choose from a growing array of network computers (NC). But good luck trying to find quality NC server software.

Despite the availability of NC hardware and all the months of talk about Java-based NCs, key vendors are only now beta-testing the server software that will actually make the slimmed-down desktops work. IBM, Sun Microsystems, Inc. and Oracle Corp.'s Network Computing, Inc. subsidiary each plan to release their server software in

*See NCs, page 15*

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## FEATURES

*Buyer's Guide: Firewalls.*
Beginning this week, we're adding a new twist to our Buyer's Guides: Testing. We brought eight top firewall products into the lab for a head-to-head review that'll help you make a more informed buying decision.

Test results: *Page 41.*
Our take on firewall trends: *Page 49.*
Product summary chart: *Page 50.*

STU SUCHIT

### PacBell E-mail outage

E-mail service bottlenecks that began early last Thursday afternoon prompted Pacific Bell Internet Services to shut down its E-mail service through early Friday morning. A Pacific Bell spokesman said the company decided to take down E-mail service after the operating system problems began so it could complete a planned installation of new hardware. The spokesman said the service was back up by 4 a.m. and that E-mail was delayed but not lost. Pacific Bell has more than 65,000 customers, according to the spokesman.

### Kodak snaps up Wang unit

Eastman Kodak Co. of Rochester, N.Y., last week announced the purchase of Wang Laboratories, Inc.'s software business unit for $260 million, a deal that was reported near completion in last week's edition of *Network World*. The Wang unit will operate as a separate Kodak subsidiary and give the photography giant a competitive boost in the growing electronic imaging market. The deal had been delayed by concerns over tax implications, a possible brain-drain from Wang and Kodak's desire to preserve a Wang-Microsoft alliance.

### Internet name calling

An Internet Society committee this week will propose a revamping of the system used to allocate Internet domain names in an attempt to internationalize the system and reduce trademark conflict over the names. The proposal calls for the creation of seven generic top-level domains — that is, the tags such as .com and .org given to the name of an entity on the Internet — and leaves the door open for the creation of many more names in the future. In addition, between 20 and 30 registries around the world will be selected at random to distribute the domain names.

### Is it safe?

The President's Commission on Critical Infrastructure Protection was created last July to recommend what role the U.S. government should play to protect communications, power-plant, banking, and transportation facilities against physical sabotage and network-based attacks. The group's chairman, Tom Marsh, last week said the 20-member panel of mostly government representatives wants input from the public on topics such as whether military intelligence, including the National Security Agency, should be allowed to conduct surveillance in the U.S. to prevent cyberattacks over the Internet. For more information, check out www.pcip.gov/pccip.

### ALR pumping out new Pentium Pro server

Advanced Logic Research, Inc. (ALR) this week will announce a six-way Pentium Pro server based on a new system bus architecture that officials said bypasses the limitations of Intel Corp.'s four-processor board. With support for six processors, the server will feature high-availability and failover functions typically found only in server clusters, ALR said. The offering will top off ALR's Revolution Series server line.

### The feeling is mutual funds

Boston-based Liberty Financial Companies last week turned on two Web sites for handling mutual funds trading transactions over the Internet. The sites employ a secured browser with an X.509 digital certificate to be issued by the financial institution.

# CA ships long-awaited Unicenter/TNG ware

**By Jim Duffy**
*New York*

The wait is over.

Computer Associates International, Inc. (CA) last week said its snazzy new Unicenter/TNG software, complete with a three-dimensional virtual reality user interface, is now generally available after a year-and-a-half wait (*NW,* July 17, 1995, page 6).

Unicenter users had mild praise for the product they employ to manage distributed networked systems, applications and network devices from a central console.

"Service levels are critical, and we're constantly looking for ways to increase system availability," said John Scallan, senior vice president of information systems at National Processing Co. in Louisville, Ky. "We evaluated alternative point solutions, but this provides seamless integration end to end."

Unicenter/TNG's comprehension also impresses Shared Medical Systems.

"We can't afford the burden of integration-testing" separate products, said Larry McDermott, advisory analyst at the Malvern,

Pa.-based company.

Like Scallan and McDermott, other CA customers will use Unicenter/TNG to help keep tabs on system availability and service-level delivery. Yet none seem bowled over by Unicenter/TNG's most unique component: its virtual reality interface, which



**CA chief Charles Wang** *presides at Unicenter/TNG rollout.*

swoops down from animated blue heavens and sweeps over golden, computer-generated plains and rugged mountain terrains to zero in on a faulty daughterboard.

"I'm not sure the 3D interface is the most valuable [component], but it is valuable," said Don Resh, senior vice president and chief information officer at The American Association of

Retired Persons Pharmacy Services in Alexandria, Va. "If I show a CFO or CEO a graphical view of our financial systems and the bottleneck, they decide how soon they're going to purchase [more equipment]."

But instead of developing a "Nintendo" interface, as one observer described it, CA might have been better advised to work on more practical uses for Unicenter/TNG. The company had to be prodded into developing scheduling, security and event management for SAP R/3 environments much sooner than it planned to.

"We're in beta with CA's SAP adapters right now," said Tony Navarro, manager of systems management at healthcare firm Allegiance Corp. in McGaw Park, Ill. "This is one area where we really pushed their schedule up by six months."

Officials from IBM's Tivoli subsidiary, CA's systems management rival, said they are glad the wait for Unicenter/TNG is over.

"Finally," said Michael D'Eath, director of business alliances for IBM/Tivoli. "We've been dealing with vaporware for a year or two now, and it's nice to have a product that customers can actually compare and see what's real."

Pricing for Unicenter/TNG starts at $2,500.

©CA: (516) 342-5224.

# Cisco pulls the plug on 7000, upgrades 7500

**By Jim Duffy**
*San Jose, Calif.*

Cisco Systems, Inc. last week said it will end sales of a 4-year-old, widely installed backbone router and upgrade the performance of its successor.

Cisco said it will end sales of its Cisco 7000 series routers, which include the seven-slot 7000 and the five-slot 7010, on July 31. The 7000 line features a single 500K bit/sec backplane and segregated routing and switching processors.

The company is offering users a credit of as much as 35% of the original price of their 7000 purchase to use toward the purchase of a Cisco 7500 series router. The 7500 line, which began shipping in September 1995, includes three chassis that have five, seven and 13 slots each, with dual backplanes, 1G to 2G bit/sec of bandwidth, integrated Route-Switch Processors (RSP) and interface

modules that switch packets locally between ports.

The demise of the 7000 was expected for some time (*NW,* July 1, 1996, page 17).

"We're not surprised," said Mel Lively, network manager at Presbyterian Healthcare in Dallas. "We're always comfortable that Cisco will take care of us."

The University of Southern California (USC) in Los Angeles had another view.

"Education gets a 30% discount to start with; do I get 35%

## 7500 WAYS TO ROUTE

These Cisco products will be available starting this month.

| Product | Price |
| --- | --- |
| Cisco 7500 with 1 RSP4 | $16,900-$30,900 |
| Cisco 7500 with VIP2-15 | $7,000 |
| Cisco 7200 with NPE-100 | $4,000 |
| 4-port full-duplex token-ring adapter | $10,000 |
| 1-port 100VG-AnyLAN adapter | $4,000 |
| 1-port full-duplex FDDI adapter | $18,000-$20,000 |
| 1-port ATM OC-3 adapter | $8,000-$10,000 |
| 2-port channelized PRI adapter | $4,500 |
| 4-port BRI adapter (7200 only) | $1,800 |
| 8-port BRI adapter (7200 only) | $2,000 |

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# Vendors to roll out high-speed switching gear

By Jodi Cohen
*Washington, D.C.*

In keeping with customers' constant search for ways to speed up their networks, a trio of vendors this week will roll out high-speed LAN devices, including IP switches and Gigabit Ethernet gear.

Jumping on the IP switching bandwagon, NBase Communications, Inc. will announce its DirectIP switching scheme at the ComNet '97 show here, *Network World* has learned. Similar to an offering recently announced by competitor Madge Networks, Inc., NBase's IP switching combines the control of routing with the performance of switching.

So what's the difference between the two approaches? Well, Madge's switch performs IP and IPX routing in Application Specific Integrated Circuits, while NBase's DirectIP switch bypasses the routing by implementing a switched virtual circuit approach borrowed from the ATM world.

Here's how DirectIP works: If Host A needs to talk to Host B, NBase's DirectIP switch will receive the initial packets from Host A, find out the direct path to Host B and transfer those frames directly to the second host. After this direct virtual path is established, Host A can go through the switching fabric directly to Host B and avoid any routing.

Kevin Tolly, president of The Tolly Group, a consulting and testing firm in Manasquan, N.J., said this approach makes sense. "This eliminates a lot of the processing because the decision to go from A to B has already been made," he said. "Whereas a traditional router or even the Madge switch that does routing in hardware still has to make that decision, which could become a bottleneck."

Tolly, however, pointed out several key problems with DirectIP, including IP-only support, the inability to switch or route between token-ring and Ethernet subnets, and the lack of built-in redundancy.

"I'd be concerned about redundancy because if I have this thing controlling my IP connections — say, in just one of my switches — and that switch goes down, I'm not sure what will happen to any existing or new IP connections," Tolly said.

NBase's first DirectIP switch will offer 24 Ethernet ports and four 100M bit/sec Ethernet uplinks, which will be on display at ComNet. The company will also roll out a 16-port DirectIP Ethernet switch and offer a DirectIP module for its GigaHub switch. Both Ethernet switches will be available this quarter, and the Gigabit Ethernet switch will be introduced in the second half of this year. Pricing starts at $11,750.

**NBase's DirectIP switch,** *with 24 Ethernet ports and four 100M bit/sec Ethernet uplinks, combines the functionality of routing with the high performance of switching, the company claims.*

### Gaga for Gigabit

On the Gigabit Ethernet front, GigaLabs, Inc. here will show off its first 1G bit/sec switch, dubbed the GigaStar 3000. The backbone switch chassis, which is expected to boast a 16G bit/sec backplane, will be able to handle full-duplex Gigabit Ethernet in each slot without being oversubscribed.

In addition, GigaLabs plans to demonstrate a Gigabit Ethernet network interface card (NIC) at the show. Both the switch and NIC will ship this month. Pricing has not yet been set.

Separately, Gigabit Ethernet start-up Prominet Corp. this week will announce its Cajun Switch Core for its upcoming LAN switching products. As expected, the gear will include a Layer 3 Gigabit Ethernet campus switch as well as a modular 10M/100M/1,000M bit/sec Ethernet stackable switch (*NW,* April 29, 1996, page 7). All the devices will support class-of-service switching, which — like ATM — manages multiple queues for prioritizing traffic.

©NBase: (818) 773-0900; GigaLabs: (800) 526-7020; Prominet: (508) 870-5570.

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# New tools to save on WAN links

By Tim Greene
*Washington, D.C.*

Wide-area vendors will use the ComNet '97 spotlight to show off new gear designed to save on expensive wide-area links.

They range from a voice frame relay access device from ACT Networks, Inc., to a time-division multiplexer (TDM) from RAD Data Communications, Inc., to a switched ATM backbone from General DataCom, Inc. (GDC) that supports the merging of small wide-area links.

ACT will roll out two additions to its NetPerformer line that let users save money by adding voice-over-frame relay capabilities to small remote sites in frame relay data networks.

The SN-8800 is a branch office device that lets users hook two analog voice phones into a corporate frame relay data network, essentially avoiding the cost of separate lines for intracorporate phone calls on the data net. With compression, the voice channels each eat up either 8K or 4.8K bit/sec when active.

It also features two serial ports for WAN or user-side connections, and an optional port for either Ethernet or token ring.

The SN-8200 is a data-only device with a serial, WAN and Ethernet port. The SN-8800 has a list price of $3,995, while the SN-8200 costs $1,850. They ship in the second quarter.

### Pretty RAD

RAD Data will introduce a way to squeeze more traffic onto T-1 lines with a traditional T-1 multiplexer that features voice compression.

Megaplex-2100 is a modular TDM that supports as many as 144 voice channels over a single T-1 private line.

With that kind of compression, the user can drop 1.55M bit/sec worth of on-network PBX voice traffic onto six time slots of a wide-area T-1 line, leaving about 1.2M bit/sec clear on the line for other traffic.

The new mux chassis has 11 I/O ports, and supports cards from its Megaplex-2000, which include interfaces for high- and low-speed data, fax, Ethernet and token ring. Available now, the mux starts at $7,000.

GDC is announcing two cards for its APEX switch family to support frame relay quality of service (QoS) by mapping frame relay virtual circuits to ATM QoS queues. They also support Frame-based User Network Interface for low-speed ATM traffic and High-Level Data Link Control traffic.

The cards fit in APEX switches for remote offices, enterprises and carriers.

The CFRAC module features four ports, each of which can support any number of 56K or 64K bit/sec channels to 1.55M bit/sec. The FRAC module supports access up to 45M bit/sec as a single pipe. CFRAC is available now for $19,000. Pricing has not been set for FRAC, which ships in the second quarter.

©ACT: (805) 388-2474; RAD: (201) 529-1100; GDC: (203) 574-1118.

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# NET readies its ATM products

By Tim Greene
*Washington, D.C.*

Network Equipment Technologies, Inc. (NET) this week at ComNet '97 will make its long-awaited appearance on the ATM scene with products that allow customers to use cell technology in the wide area without scrapping their multiplexers.

NET's Promina ATM product family includes an ATM module that plugs into the company's flagship IDNX multiplexer as well as management software that works across NET products. And its future plans call for a 1G to 5G bit/sec ATM LAN switch that can handle all LAN traffic, FDDI, and 1.55M and 45M bit/sec trunks. It will also inverse-multiplex 1.55M bit/sec trunks.

The CellXpress ATM module for the IDNX enables the chassis to support ATM trunking for frame relay or time-division multiplexed (TDM) traffic. It comes in two models, one with four DS-1 ports that can be inverse multiplexed, giving users a range of WAN ATM pipes from 1.55M to 6.2M bit/sec. The other model supports a single DS-3 pipe at 45M bit/sec.

CellXpress allows the user to tie frame relay networks into an ATM backbone through full frame relay-to-ATM service interworking.

CellXpress fits into NET's Vista architecture, which was announced in 1995 with the intent of delivering products this year. Back when the architecture was rolled out, the wait for products was viewed as a detriment, but products from other vendors have not sprung up to supplant NET gear.

"At this point, anything is a good thing if it lets the IDNX migrate to ATM," said Rosemary Cochran, an analyst with Vertical Systems Group in Dedham, Mass. "This is long overdue."

In addition to CellXpress, the ATM line includes Promina 2000, which is an ATM multiplexer, and Promina 4000, a 10G bit/sec ATM switch.

The mux also supports user interfaces for frame relay and TDM via a channelized T-1 card.

The Promina 4000 switch is designed for carriers or large enterprises, and supports trunking at OC-3, with plans to go as high as OC-48. The switching fabric is fully distributed among modules to ensure good performance.

The company's new PanaVue network management system is browser-based and features event correlation that groups alarms to identify common problems. It also lets carriers partition traffic to let customers view their circuits.

Pricing for Promina 4000 starts at $80,000, while CellXpress costs $15,000 for T-1 trunks and $22,000 for T-3s. Both will be available in the third quarter.

Promina 2000 pricing starts at $60,000, and PanaVue starts at $25,000. They will available in the second quarter.

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**This Proxima 4000** *switch anchors NET's new ATM product line, which includes the Proxima 2000 multiplexer and CellXpress module.*

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# Lotus sharpens 'Net message

*Client offerings and Java dominate Lotusphere '97 gathering of customers and developers.*

**By Paul McNamara**
*Orlando, Fla.*

From company President Jeff Papows right on through the rank and file, Lotus Development Corp. was singing a singular Disney-like tune at last week's jam-packed customer conference here: "It's a Web world after all."

Lotusphere '97 may have lacked a big bang moment, but attendees were generally impressed by a string of announcements from the Cambridge, Mass.-based groupware heavyweight that will continue its transition from a once-closed world of Notes to the openness of Web-

> "Lotus is deeply committed to Java. Domino is now a first-rate container for Java-based applets."
>
> **Jeff Papows, president, Lotus**

enabled Domino. Highlights included:

● A pair of new Notes clients, code-named Lookout and Maui, slated for delivery in the first half and fourth quarter of this year, respectively. Lookout will feature an improved navigation system and work with other Web-enabled products, such as Microsoft Corp.'s Office97 and Internet Explorer, while Maui promises support for Internet Message Access Protocol 4 (IMAP), Lightweight Directory Access Protocol (LDAP) and other Internet protocols.

● A beefed-up E-mail strategy featuring a four-pronged client menu that includes two new options: Lotus Mail, with Post Office Protocol 3, Multi-purpose Internet Mail Extensions and LDAP support; and Lotus Mail/Java Edition, designed for no-frills use on network computers (NC).

In addition, Lotus unveiled cc:Mail Release

8, quelling persistent speculation regarding that line's demise.

● Plans for a set of Java-based applets, including a spreadsheet and text editor, designed to run on NCs and browsers.

● Word that the next upgrade of Domino 4.5 server, due midyear, will include support for IMAP4 and LDAP. Also, IBM — Lotus' parent company — announced that Domino will be available on its System/390 and Application System/400 machines.

The client was clearly king at this show.

"Some people thought we were giving up on the client business — we were not," said Mike Zisman, Lotus' executive vice president of strategy, during the opening-day assembly.

Java stands as the foundation of that renewed commitment.

"IBM and Lotus together represent the largest Java-based development effort in the industry," boasted Papows, pegging the combined Java workforce at about 1,000 employees.

The intensified Web focus won plenty of praise from analysts and customers.

"They are successfully reinventing themselves as an Internet company," said Jim Greene, an analyst with Summit Strategies of Boston. "For a big company, they've made quite a turnaround."

"The Java components were very compelling," said Fritz Von Bulow, Notes manager for Unisys Corp. in Blue Bell, Pa. "It's something that everybody has to come to grips with, and they may be there first."

While the phrase "Lotus: Not just Notes anymore" was uttered approvingly in the conference hall, there were doubts expressed regarding the slew of new choices from Lotus and its business partners.

"It's getting to the point where it's almost confusing," said J. Norman Dobbs, IT director for the college division at Houghton-Mifflin Co., a Boston-based publishing house. "It's hard to sort out what I need.

There are so many Internet options and different ways of moving toward Web commerce."

However, Dobbs expressed "great interest" in Domino.merchant, which allows organizations to conduct business via their Web sites. Lotus said at the show that Domino.merchant will ship in 30 days.
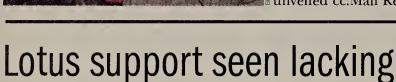
In addition, IBM said the Domino server for S/390 will support interfaces into IBM's legacy CICS and IMS transaction processing applications, and enable new large-scale collaborative Web applications.

IBM also is adding Domino to its popular mid-range AS/400 family. Domino for AS/400, which will be available by year-end, will run natively as an OS/400 application on IBM's newest Reduced Instruction Set Computing-based mid-range boxes.

*Senior Editor Michael Cooney contributed to this story.*

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**WET BLANKET**

Microsoft just couldn't leave Lotus in peace, even during the week of the big Lotusphere '97 conference. Microsoft issued a press release last Monday touting "an independent, nationwide study of IT managers" in which 70% of them preferred Microsoft Exchange compared with only 18% that preferred Lotus' Domino.

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# Lotus support seen lacking

*Company pledges improvement; details to come.*

**By Paul McNamara**
*Orlando, Fla.*

While no one has accused Lotus Development Corp. of leaving the job to that lonely Maytag repairman, customers said its service and support has fallen off noticeably as the number of installed Notes/Domino seats has mushroomed by millions.

In response to intensified grumbling, executives at Lotus and parent company IBM last week promised Lotusphere '97 attendees that improvements are on the way.

However, they were skimpy on specifics and, in fact, may have caught their own support executives unprepared.

"We must fix Lotus' service and support problem," IBM Chairman Louis Gerstner told 9,000 customers and business partners, many of whom answered his pronouncement with rousing applause.

Given that Lotus is projecting

1997 sales that would almost double its base of 9.5 million Notes users, there may be cause for customers to fear matters getting worse before they get better.

"With the enormous growth that we talked about, we've had the phone lines clogged and more extensive wait times than we would like," Lotus President Jeff Papows told *Network World.* "We've also been hiring and training people at a rate where we have to mature [their] skills in order to have the same fidelity in the quality of the answers."

While some Lotusphere attendees reported few, if any, such problems, most needed little prompting to spill their gripes.

"We've been using Notes for several years, and we've never been high on their support," said one insurance company's

administrator of 300 Notes seats.

"It's not uncommon to be on hold for a long time waiting for a representative," added Rick Decker, a Notes administrator for Union Pacific Railroad.

And once that phone does get answered, users complained, there is no guarantee that a helpful answer will be forthcoming.

Although unable to provide details, Lotus and IBM executives ticked off several measures they are mulling:

● Establishment of a World Computing Center in Cambridge that will focus, in part, on the need to improve support.

● Access for Lotus customers to 18 IBM support and service centers worldwide.

● A special SWAT team for critical on-site engineering.

Papows sees last week's mea culpa as an important step in the process.

"It's always comforting," he said, "to hear that the jerk at the top of the company understands the person down at the seat has got a problem." ∎

**IBM's** *Gerstner promises Lotus customers better service and support.*

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# Proposed server backup specification is gaining ground

**By John Robinson**

Backers of a proposed protocol that lets different servers and backup software interoperate last week began shipping a software developers' kit (SDK) to help speed the protocol's adoption.

Network Appliance, Inc. and Peripheral Devices Corp. (PDC) are codevelopers of the Network Data Management Protocol (NDMP), first announced last October. NDMP will eliminate the need for vendors to port their data management software to different combinations of file servers and storage devices.

Vendors that want to market NDMP-compliant products can license libraries included in the SDK.

The protocol is still being reviewed by the Internet Engineering Task Force, and approval is not expected until later this year. However, last December, PDC and Network Appliance enabled their product lines for NDMP, and the availability of the protocol's SDK will put more NDMP-compliant products on the market.

Analysts said all the NDMP activity is not premature and can only help in the long run.

"It's difficult to wait around until all of the t's are crossed and i's are dotted," said Robert Abraham, vice president of Freeman Associates, Inc., a market research firm in Santa Barbara, Calif. "You can't get started unless you make the first step, and that is what they are doing, moving their standard forward."

Network Appliance and PDC officials said if changes are made to the protocol during the approval process, vendors and customers will receive a software upgrade.

## A growing family

Three additional companies recently gave their support to the Network Data Management Protocol initiative, which has garnered support from 32 companies since its introduction last October.

| Company | Headquarters | Products |
|---|---|---|
| HolonTech | San Jose, Calif. | RAID storage systems |
| Ornetix | San Jose, Calif. | CD-ROM server and management software |
| MultiStream | Edina, Minn. | Network backup and storage management tools |

The NDMP SDK and a copy of the spec can be downloaded from the NDMP Web site (www.ndmp.org). The site also features a discussion group and a complete list of vendors backing the initiative. ■

# LDAP
*Continued from page 1*

adoption of groupware, network operating systems and other products — until summer.

One camp — which includes an original LDAP author from British directory vendor ISODE, Ltd. — claims the specification needs more features to help companies set up and use directory services. The other side — led by vendors such as Digital Equipment Corp. and Microsoft Corp. — wants to include security and referral additions, but keep the underlying protocol as simple as possible to help get new products out the door faster.

LDAP, created at the University of Michigan back in 1989, gained prominence in April when Netscape Communications Corp. and almost 50 other vendors publicly pledged to ship products supporting it. The scaled-down X.500 protocol gives client and LDAP-enabled applications access to disparate directories, even across the Internet, which previously lacked a standard directory.

But some vendors insist LDAP 3.0 must stretch beyond simple directory access to catch on. "Until LDAP takes on a broader role, [it] will only be effective for the most trivial of applications," said Steve Kille, co-author of the LDAP specification and chief executive officer of ISODE.

The simplicity proponents contend that LDAP should be as trim as possible. This will help to ensure that LDAP clients and servers can work together and will make it easier to develop directory-enabled applications.

Nick Emery, an engineer with Digital's AltaVista Group, said LDAP 3.0 draft proposals to date are "so complex that it would have been a huge barrier to implementation."

"Moving the standard forward quickly means stripping the extra stuff out," said Chris Weider, program manager for LDAP at Microsoft. "Each new administration feature adds another month to the process."

Netscape is also leaning toward the side of simplicity to ensure that LDAP 3.0 products get to market, according to Frank Chen, senior product manager for the Netscape Directory Server. "We don't want support for LDAP to decline because we couldn't get the update out of the gate," he said.

The IETF LDAP working group has designated a small group of engineers to come up with a proposal on how to pare down the specification. This group is expected to have a draft proposal posted on the Web later this month.

Features on the chopping block include paged results, which simplify the presentation of search data back to the LDAP client, and dynamic attributes, which allow ever-changing information such as static IP addresses to be stored in the directory.

Tim Howes, a Netscape product manager and chairman of the IETF LDAP working group, said the draft will include an extensibility mechanism that outlines how new features can be written to support the underlying protocol and interoperate with its base features. ■

## OPENING UP TO LDAP

The Open Group is opening up its Distributed Computing Environment (DCE) to LDAP clients. Working in conjunction with IBM, HP and Digital, The Open Group by year-end will enable information contained in its DCE Cell Directory Service to be published in LDAP 2.0 directories and be accessible via all LDAP clients.

# IETF integrity questioned

The Internet Engineering Task Force (IETF), widely respected as the group of freethinking academics and engineers who write 'Net protocols, is now coming under fire for its ties to major corporations.

Specifically, Ipsilon Networks, Inc. of Palo Alto, Calif., has accused Cisco Systems, Inc. of trying to keep customers from buying Ipsilon's IP Switching products. Cisco is doing so, Ipsilon alleges, by cajoling the IETF into spending a couple years developing an industry switching standard — and buying time for Cisco to complete its rival Tag Switching scheme.

At the heart of Ipsilon's complaint is Fred Baker, the IETF chairman and a senior software engineer at Cisco.

Baker said the IETF's decision to develop an IP switching standard has nothing to do with his position at Cisco. He pointed out that IBM and Toshiba Corp. submitted competing proposals to the IETF. Meanwhile, Ipsilon has bowed out, saying there is no need for an official standard.

"Quite frankly, I disagree with Cisco sometimes…," Baker said. "It's just that I have committed the deep, dark sin of working for a successful company."

Baker also denied allegations that he is a Tag Switching proponent, saying he has scant contact with the work at Cisco. But *Network World* found that he has authored at least two papers on the topic and is listed as a significant contributor for an overview of Tag Switching architecture.

For the complete text of this story, check out Network World Fusion.
— *Todd Wallack*

# The switched IP race is on

*Vendors promise you will see end-to-end quality of service by year-end.*

**By Tim Greene**
*New York*

3Com Corp., Cascade Communications Corp. and IBM last week stuck their necks out, promising to add support later this year for desktop-to-desktop quality-of-service (QoS) controls across wide-area networks.

With a plan that bonds their individual LAN and WAN IP switching schemes, the companies said they will be able to map traffic priorities that guarantee network response times needed by critical or time-sensitive applications.

The necessary elements will be ready about the time Cisco Systems, Inc.'s alternative, Tag Switching, hits the market. But the 3Com-Cascade-IBM team said its answer has the advantage of being interoperable with other vendors' gear through industry standards.

Its architecture calls for desktops, routers, and local- and wide-area switches to cooperate on traffic prioritization, but users can reap benefits even if they do not upgrade all three areas, ac-cording to Mick Seaman, chief technical officer for 3Com.

*3Com Chairman and CEO Eric Benhamou promises faster network transit times.*

The two main components being lashed together are 3Com's Fast IP and Cascade's IP Navigator. IBM has agreed to make its routing and switching software compatible, too.

Fast IP, which will be available this fall, lets desktops request a switched path rather than a slower routed one. IP Navigator, in beta test now, avoids routers by incorporating routing tables in each I/O card of Cascade 9000 and CBX 500 switches. It also uses preestablished virtual paths to express traffic through the network.

The two are tied together using the Ipsilon Flow Management Protocol, the industry-standard RFC 1953 that assigns a switched path to a particular IP traffic stream, again limiting router involvement. The protocol was developed by Ipsilon Networks, Inc.

"The only time you talk to a router is when you put out a request for a response," said Rey Mulero, network engineer for Sprint United Telephone Co. in Altamonte Springs, Fla.

He said the company's internal network relies on 3Com gear as well as Cisco routers, and it could benefit from the architecture 3Com has laid out. "If I were to implement this, it would make things faster," Mulero said.
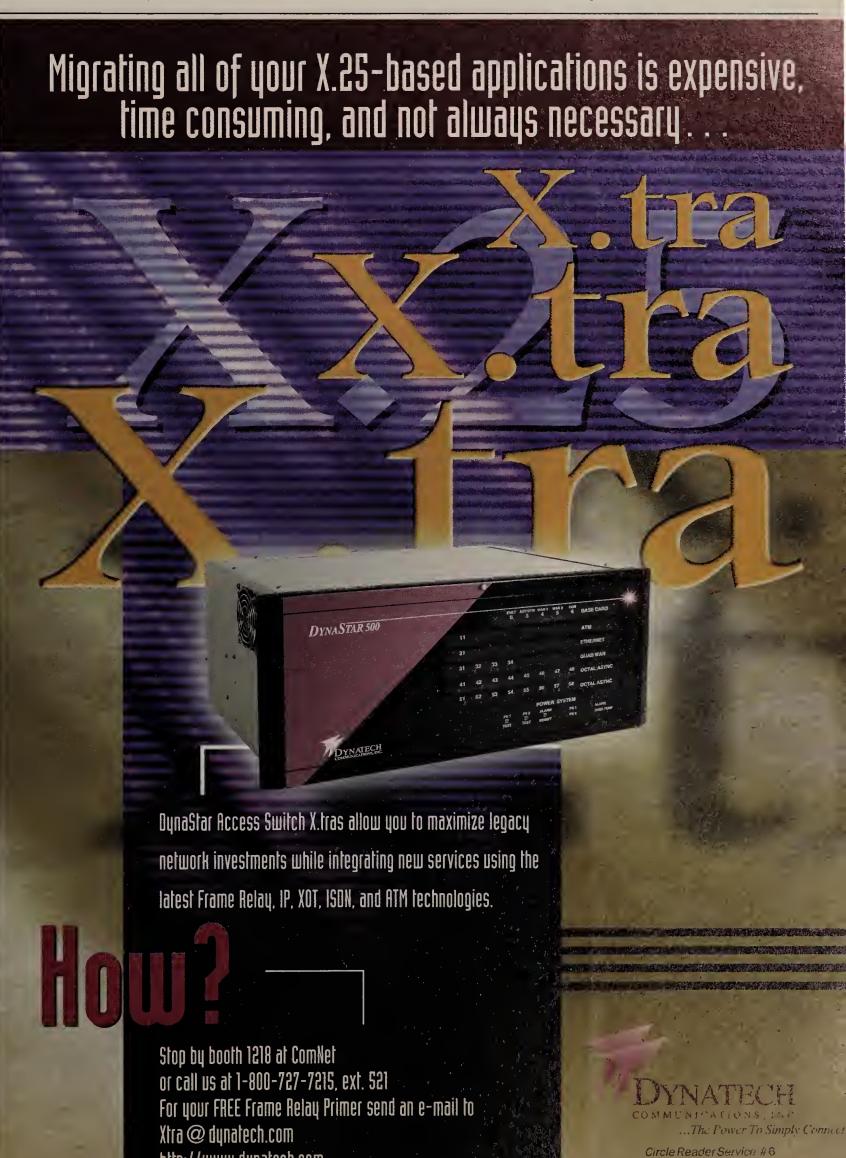
According to 3Com, its Fast IP technol-ogy will introduce QoS levels to the LAN. The priority that traffic would receive would be determined by what virtual LAN a particular workstation is assigned.

3Com foresees supporting four common QoS levels: less than a 10-msec delay; less than a 100-msec delay; access for as much as half the available network bandwidth with no delay parameter; and best effort.

3Com Chairman and Chief Executive Officer Eric Benhamou said 3Com found Cascade's IP switching scheme superior to Cisco's in several ways. It is based on open standards that make it easy to interact with, and its virtual paths operate at Layer 1, whereas Cisco's routers operate at Layer 3.

"Layer 1 is better than Layer 3," Benhamou said. "Why? Because it's faster and cheaper." ∎

# Internet telephony vendors look to outgrow hobbyists

By Chris Nerney

Industry analysts may differ on whether — and to what extent — the Internet telephony market has moved beyond techno-hobbyists to widespread adoption by the corporate world.

They agree, however, that the Internet telephony vendors who can survive until then will be those with the deepest pockets. That should offer encouragement for investors in VocalTec, Ltd. and Voxware, Inc., both of which last week reported mounting operating losses despite record revenues (see graphic).

"The ones that went public should have the capitalization to hang on," said telephony industry analyst Jeff Pulver.

VocalTec and Voxware each made stock offerings in 1996, raising $47.5 million and $18.1 million, respectively.

It is much-needed money, too, because VocalTec, an Israeli company, lost $2.35 million in the quarter ended Dec. 31, 1996, while Princeton, N.J.-based Voxware had a net loss of $2.41 million.

### FINANCIALS FOR VOCALTEC AND VOXWARE

| In thousands | Revenues | Earnings |
| --- | --- | --- |
| **VocalTec** | | |
| Q4* 1995 | $973 | ($525) |
| Q4* 1996 | $3,012 | ($2,354) |
| **Voxware** | | |
| Q2* 1996 | $108 | ($570) |
| Q2* 1997 | $1,512 | ($2,410) |
| *Ended Dec. 31 | | |

While both companies would prefer to be reporting profits, analysts said the key in the early stages of a market is positioning. VocalTec, in particular, seems to be making an effective transition from targeting the consumer hobbyist market to corporations.

The Internet Phone, aimed at consumers, put VocalTec on the map when it was released in February 1995.
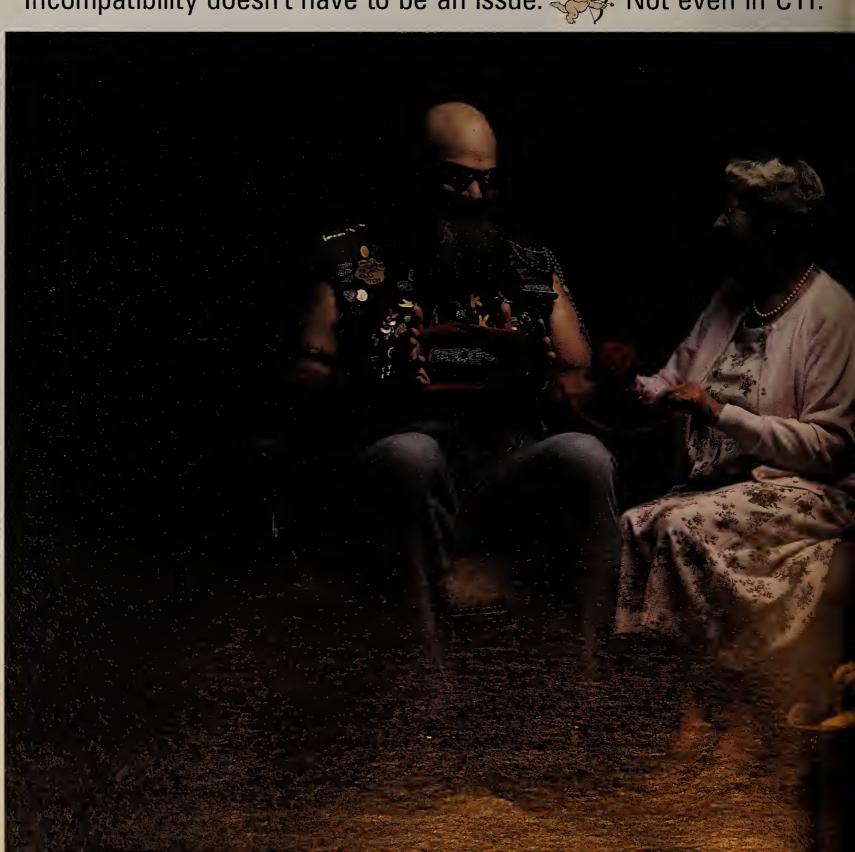
But Chief Executive Officer Elon Ganor said even back then, VocalTec was eyeing the potentially more lucrative business market.

In mid-1996, the company released its Telephony Gateway, which allows companies to make phone-to-phone calls over the Internet.

The Internet Phone was responsible for 98% of VocalTec's revenue in the first two quarters of 1996; it accounted for less than half of fourth-quarter revenue.

"What was particularly good about their revenues was the mix, which now comes largely from the gateway products meant for telcos and large corporate networks," said analyst Ted Flomenhaft of L. Flomenhaft & Co.

Still, he said, "The real game has not yet begun. Most of their sales of gateway software is not for deployment.

It's for evaluation."

When the "real game" does begin, it will include giants such as Microsoft Corp., Netscape Communications Corp. and Intel Corp., all of which "have a telephony hedge right now," according to Pulver.

"But of all the smaller vendors, VocalTec certainly is best positioned to take off, when and if Internet telephony moves from being a hobbyist environment to being a tool that's adopted and used by large businesses," Pulver said.

To some degree, that is already happening. VocalTec recently announced marketing agreements with Telecom Finland, Telecom South Korea and Telecom New Zealand. And Voxware has signed licensing pacts with service providers WorldCom, Inc. and America Online, Inc. ■

# NCs

three to six months.

The server software launches the NC device, connects it to the network, configures and downloads the users' desktop layout into memory, and authorizes access to specific applications.

In the meantime, potential customers should carefully check out the limitations of this software, in terms of platforms and functions, and how easily it integrates with existing tools.

IBM's Network Station Manager (NSM), due out in April, will run on a wide range of operating system platforms, from PC LAN servers to MVS mainframes.

NSM is based on HTML and JavaScript, and uses the standard Common Gateway Interface to access back-end applications and data.

"We wanted to make it very easy to configure and manage the Network Station environment," said Bruce Anthony, IBM's chief architect and strategist for the Network Station device.

NSM allows systems administrators to set up and manage each user's desktop from the server. Today, they have to physically sit down at the user's PC to do that. The NC server software will also include the NC boot program, the server operating system, authentication service, and Network File System for mounting and managing files on the server.

## Oracle's NCI plan

In addition to the standard initialization and authorization, NCI's server software will include a framework for downloading and running Java and HTML applications on the NC device, as well as programs for file access and network printing.

One part of this server software, called Application Manager, will let the NC server handle Java applications.

Systems management software will enable administrators to oversee a network of NC servers so, for example, applications can be pushed out from a headquarters server to NC servers running in branch offices.

### Surveying network computer demand

The preliminary results of a survey of 50 companies* to determine the corporate market for NCs.

▶ **17%** Will spend money on NCs this year
▶ **54%** Will evaluate or pilot NCs this year
▶ **65%** Plan to buy NCs within two years
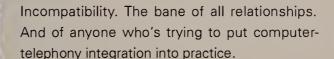
*More than one response allowed.
SOURCE: THE YANKEE GROUP, BOSTON

As one might expect, NCI's server package relies heavily on products from Oracle. The server repository is the Oracle7 database manager with an HTML browser. Also included are Oracle's Web server software, a Post Office Protocol 3-compliant E-mail client and NC Server Manager, which is essentially a Web interface to Oracle's Enterprise Server Manager.

Sun is taking a "pure Java" approach to its NC server software, which will run on Sun's Netra j Solaris server. The server package, due this summer, includes the operating software that is downloaded to the JavaStation NC. This comprises the JavaOS, a set of applets for initializing and authenticating the user, and for running Java applications; and HotJava Views, a set of desktop applets, including the HotJava Web browser for E-mail and calendar management.

A key element is a new programming interface, the Java Management API, which will make the servers and the NCs visible to and manageable by Sun's Solaris Enterprise Manager. "We tried to zero-out the administration on the client and move this back to a server in a central location," said Brian Healy, Sun's JavaStation product manager.

Prospective NC users should look closely not only at the server hardware needs, but what these software packages impose in limits or trade-offs. For example, Sun's NC server code only runs on its Solaris Unix servers. ∎

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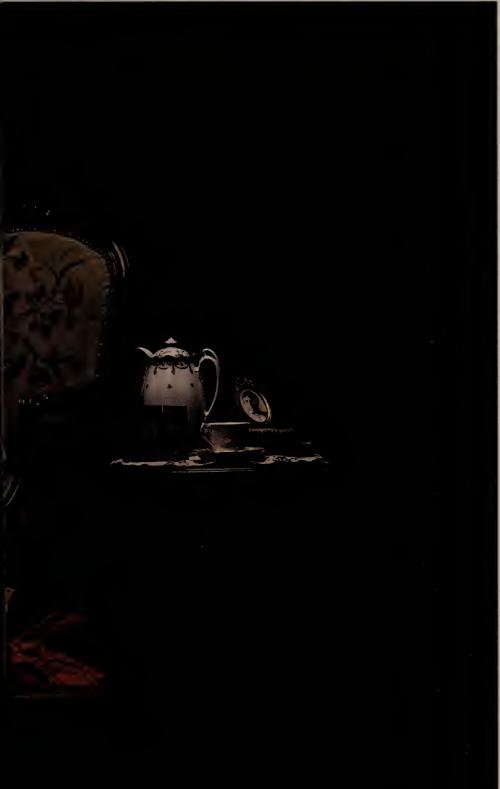
To learn more, call **1-800-765-6123, ext. J12**. Or drop by our Web site at **www.siemenscom.com**.
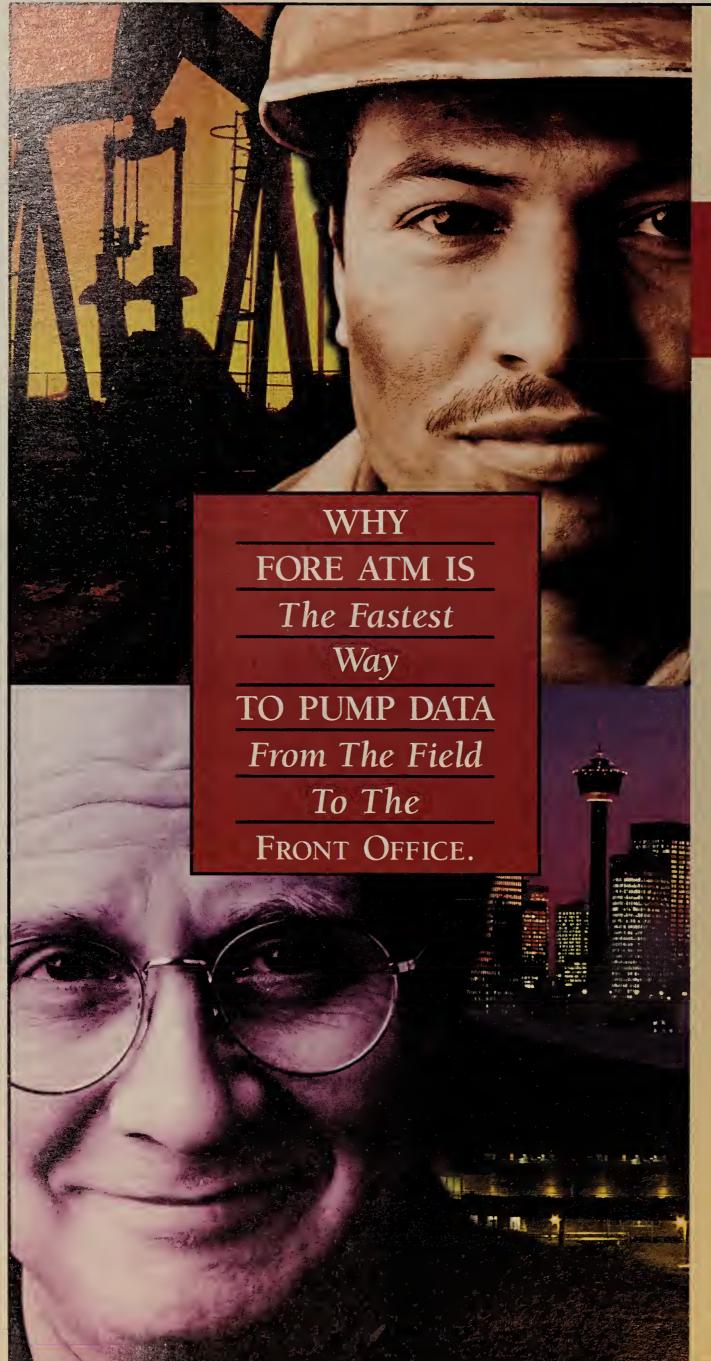
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Andrew Kyle
*President*
*MetroNet*

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**FORE** SYSTEMS

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**1 Industry:** (check one only)

01. ☐ Manufacturers (other)
02. ☐ Finance/Banking
03. ☐ Insurance/Real Estate/Legal
04. ☐ Health Care Services
05. ☐ Hospitality/Entertainment/Recreation
06. ☐ Media/TV/Cable/Radio/Print
07. ☐ Retail/Wholesale Trade/Business Services
08. ☐ Transportation
09. ☐ Utilities
10. ☐ Education
11. ☐ Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry)
12. ☐ Government (Federal/State/Local)
13. ☐ Military
14. ☐ Aerospace
15. ☐ Consultants (Independent)
16. ☐ Carriers/Interconnects
17. ☐ Manufacturers (Computer/Communications)
18. ☐ Resellers of Computer/Network Products (VARs, VADs)
19. ☐ Systems/Network Integrators
20. ☐ Distributors (Computer/Communications)
21. ☐ Other *(please specify)*_____

**2 What is your job function?** (check one only)

**NETWORK IS MANAGEMENT:**
1. ☐ Networking Management
2. ☐ LAN Management
3. ☐ Datacom/Telecom Management
4. ☐ IS, IT, MIS, Systems Management

5. ☐ Engineering Management
6. ☐ Corporate Management (CIO, CEO, Pres., VP, Dir., Mgr., Financial Management)
7. ☐ Consultant (Independent)
8. ☐ Other *(please specify)*_____

**3 What is the estimated value of networking equipment and services that you help specify, recommend or approve?** (check one only)

01. ☐ $100 million or more
02. ☐ $50 mil. - $99.9 mil.
03. ☐ $25 mil. - $49.9 mil.
04. ☐ $20 mil. - $24.9 mil.
05. ☐ $10 mil. - $19.9 mil.
06. ☐ $5 mil. - $9.9 mil.
07. ☐ $1 mil. - $4.9 mil.
08. ☐ $500,000 - $999,999
09. ☐ $250,000 - $499,999
10. ☐ $100,000 - $249,999
11. ☐ None of the above

**4 What is the total number of sites for which you have purchase influence?** (check one only)

1. ☐ 100+
2. ☐ 50 - 99
3. ☐ 20 - 49
4. ☐ 10 - 19
5. ☐ 2 - 9
6. ☐ 1
7. ☐ None

**5 Are you involved in the purchase of and/or plan to purchase network products and services?**

☐ Yes     ☐ No

**6 Check ALL that apply in Columns A and B:**
A. I am involved in the purchase of the following products/services:
B. I plan to purchase the following products/services:

**LOCAL-AREA NETWORKS**
A B
☐ ☐ 01. Local-Area Networks
☐ ☐ 02. Network Op. Sys. Software
☐ ☐ 03. LAN Storage/Backup
☐ ☐ 04. Optical LAN Storage/Backup
☐ ☐ 05. Disk LAN Storage/Backup
☐ ☐ 06. Tape LAN Storage/Backup
☐ ☐ 07. RAID LAN Storage/Backup
☐ ☐ 08. Network Test/Diagnostic Tools
☐ ☐ 09. Cables, Connectors, Baluns
☐ ☐ 10. UPS
☐ ☐ 11. Network Interface Cards
☐ ☐ 12. Peer-to-Peer LANs
☐ ☐ 13. SNMP Network Management
☐ ☐ 14. ATM Switches
☐ ☐ 15. Token-Ring Switches
☐ ☐ 16. Ethernet Switches
☐ ☐ 17. Remote LAN Access/Communications Servers
☐ ☐ 18. Superservers
☐ ☐ 19. File/Application Servers
☐ ☐ 20. Print Servers/Fax Servers
☐ ☐ 21. CD-ROM Servers
☐ ☐ 22. LAN Servers

**INTERNETWORKING**
A B
☐ ☐ 23. Bridges
☐ ☐ 24. Routers
☐ ☐ 25. Bridge/Router
☐ ☐ 26. Gateways
☐ ☐ 27. Intelligent Hubs
☐ ☐ 28. Stackable Hubs

**COMPUTERS/PERIPHERALS**
A B
☐ ☐ 29. Laptops/Notebooks/Sub-Notebooks
☐ ☐ 30. Micros/PCs
☐ ☐ 31. Minis
☐ ☐ 32. Mainframes
☐ ☐ 33. Workstations
☐ ☐ 34. Terminals
☐ ☐ 35. Printers/Network Printers
☐ ☐ 36. Cluster Controllers
☐ ☐ 37. CD-ROM
☐ ☐ 38. Fax/Modem Boards

**REMOTE/WIRELESS COMPUTING**
A B
☐ ☐ 39. PDAs
☐ ☐ 40. PCMCIA Devices
☐ ☐ 41. Wireless Data Services
☐ ☐ 42. Wireless Data Equipment
☐ ☐ 43. Wireless LANs
☐ ☐ 44. Cellular Equipment & Services

**INTERNET/INTRANET**
A B
☐ ☐ 45. Internet Access Service
☐ ☐ 46. Firewalls/Security
☐ ☐ 47. Web Servers

**INTERNET/INTRANET (cont'd)**
A B
☐ ☐ 48. Web Browsers
☐ ☐ 49. Intranet Applications/Groupware
☐ ☐ 50. Search Retrieval Products (web crawler)
☐ ☐ 51. Internet Development Tools
☐ ☐ 52. Internet Commerce Tools

**SOFTWARE/APPLICATIONS**
A B
☐ ☐ 53. Network Management
☐ ☐ 54. Systems Management
☐ ☐ 55. Security
☐ ☐ 56. Communications Software
☐ ☐ 57. Terminal Emulation
☐ ☐ 58. Word Processing
☐ ☐ 59. Operating Systems
☐ ☐ 60. Client/Server Applications Development
☐ ☐ 61. Database Management/RDBMS
☐ ☐ 62. Spreadsheet
☐ ☐ 63. Groupware
☐ ☐ 64. EDI
☐ ☐ 65. E-mail
☐ ☐ 66. Windows/Graphical User Interface
☐ ☐ 67. Multimedia
☐ ☐ 68. Graphics/DTP
☐ ☐ 69. Remote Access
☐ ☐ 70. Imaging
☐ ☐ 71. Server Suites (Back office, etc.)
☐ ☐ 72. Suites
☐ ☐ 73. Middleware
☐ ☐ 74. Document Management
☐ ☐ 75. Database Server
☐ ☐ 76. Site Metering Tools
☐ ☐ 77. Computer-Integrated Telephony (CIT)

**WIDE-AREA NETWORK EQUIPMENT & SERVICES**
A B
☐ ☐ 78. Frame Relay Equip./Services
☐ ☐ 79. Modems
☐ ☐ 80. FT-1/T-1/T-3 Multiplexers
☐ ☐ 81. FT-1/T-1/T-3 Services
☐ ☐ 82. SONET
☐ ☐ 83. Inverse Multiplexers
☐ ☐ 84. SMDS
☐ ☐ 85. Asynchronous Transfer Mode
☐ ☐ 86. Diagnostic/Test Equipment
☐ ☐ 87. DSU/CSU
☐ ☐ 88. VSAT/Satellite
☐ ☐ 89. ISDN Equipment & Services
☐ ☐ 90. PBXs
☐ ☐ 91. Voice Mail/Response
☐ ☐ 92. Videoconferencing
☐ ☐ 93. Leased Lines
☐ ☐ 94. Switched Data
☐ ☐ 95. E-mail
☐ ☐ 96. 800/900/MTS Services
☐ ☐ 97. Virtual Networks
☐ ☐ 98. Outsourcing/Systems Integration Services
☐ ☐ 99. Education/Training Services

☐ 107 ☐ None of the above (1-99)

**7 Check ALL that apply in Columns A and B:**
A. The following network platforms are currently installed:
B. The following network platforms are planned for purchase:

**NETWORK PROTOCOLS**
A B
☐ ☐ 01. SNA
☐ ☐ 02. DECnet
☐ ☐ 03. TCP/IP
☐ ☐ 04. Novell IPX/SPX
☐ ☐ 05. APPC/APPN/LU 6.2
☐ ☐ 06. NETBIOS
☐ ☐ 07. AppleTalk
☐ ☐ 08. NFS
☐ ☐ 09. IPv6
☐ ☐ 10. SNMP/SNMPv2
☐ ☐ 11. Other *(please specify)*____

**NETWORK OPERATING SYSTEM**
A B
☐ ☐ 12. Microsoft (LAN Manager)
☐ ☐ 13. Novell (NetWare 2.X, 3.X)
☐ ☐ 14. Novell (NetWare 4.X)
☐ ☐ 15. Windows NT
☐ ☐ 16. Windows NT/Advanced Server
☐ ☐ 17. LocalTalk (AppleTalk)
☐ ☐ 18. Banyan (VINES)
☐ ☐ 19. IBM (LAN Server)
☐ ☐ 20. IBM (PC LAN Program)
☐ ☐ 21. Artisoft (LANtastic)
☐ ☐ 22. Digital (Pathworks)
☐ ☐ 23. Other *(please specify)*____

**LAN ENVIRONMENT**
A B
☐ ☐ 24. 4M Token Ring
☐ ☐ 25. 16M Token Ring
☐ ☐ 26. Ethernet
☐ ☐ 27. Fast Ethernet
☐ ☐ 28. 100vg Any LAN
☐ ☐ 29. FDDI
☐ ☐ 30. LocalTalk
☐ ☐ 31. 10Base-T
☐ ☐ 32. ATM
☐ ☐ 33. Other *(please specify)*____

**COMPUTER OPERATING SYSTEM**
A B
☐ ☐ 34. DOS
☐ ☐ 35. Unix/Xenix/AIX
☐ ☐ 36. OS/2
☐ ☐ 37. OS/2 Warp
☐ ☐ 38. IBM MVS
☐ ☐ 39. IBM VM
☐ ☐ 40. Digital VMS
☐ ☐ 41. Macintosh
☐ ☐ 42. Windows
☐ ☐ 43. Windows 95
☐ ☐ 44. NT
☐ ☐ 45. Solaris
☐ ☐ 46. Other *(please specify)*____

☐ ☐ 47. None of the above (1-46)

**8 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?**

**A. SCOPE** (check one only)
1. ☐ Corporate/Enterprise
2. ☐ Department
3. ☐ None

**B. INVOLVEMENT** (check all that apply)
1. ☐ Recommend/Specify
2. ☐ Approve
3. ☐ Evaluate
4. ☐ Determine the need
5. ☐ None

**9 What is the total number of LANs, workstations/nodes at this location/in your organization?**

| At this location: | | Entire organization: | |
|---|---|---|---|
| LANs | Workstations/Nodes | LANs | Workstations/Nodes |
| 1. ☐ 5,000+ | ☐ | 1. ☐ 5,000+ | ☐ |
| 2. ☐ 1,000 - 4,999 | ☐ | 2. ☐ 1,000 - 4,999 | ☐ |
| 3. ☐ 100 - 999 | ☐ | 3. ☐ 100 - 999 | ☐ |
| 4. ☐ 50 - 99 | ☐ | 4. ☐ 50 - 99 | ☐ |
| 5. ☐ 10 - 49 | ☐ | 5. ☐ 10 - 49 | ☐ |
| 6. ☐ 1 - 9 | ☐ | 6. ☐ 1 - 9 | ☐ |

**10 Please indicate your involvement in developing/implementing Internet/Intranet Technologies:** (check all that apply)

1. ☐ Recommend/Specify   2. ☐ Approve   3. ☐ Evaluate
4. ☐ Determine the need   5. ☐ Implement   6. ☐ None

**11 Which of the following hardware platforms are installed/planned in your company?** (check all that apply)

| Mainframes | A – Installed | B – Planned | Minis | C – Installed | D – Planned |
|---|---|---|---|---|---|
| 1. IBM | ☐ | ☐ | 1. IBM | ☐ | ☐ |
| 2. Amdahl | ☐ | ☐ | 2. Digital | ☐ | ☐ |
| 3. Cray | ☐ | ☐ | 3. Tandem | ☐ | ☐ |
| 4. Hitachi | ☐ | ☐ | 4. Unisys | ☐ | ☐ |
| 5. Unisys | ☐ | ☐ | 5. AT&T GIS | ☐ | ☐ |
| | | | 6. HP | ☐ | ☐ |
| | | | 7. Data General | ☐ | ☐ |

**What is the total number of Servers/Clients installed/planned: (USE NUMBERS ONLY)**

| E-AT THIS LOCATION # | F-% with Internet Access |
|---|---|
| 1. Servers | % |
| 2. Clients | % |

| G-ENTIRE ORGANIZATION # | H-% with Internet Access |
|---|---|
| 1. Servers | % |
| 2. Clients | % |

**Which of the following Servers/Clients do you have installed/planned: (CHECK ALL THAT APPLY)**

| | At this location: | | Entire organization: | |
|---|---|---|---|---|
| | I-Servers | J-Clients | K-Servers | L-Clients |
| 01. Power PC | ☐ | ☐ | ☐ | ☐ |
| 02. Power Mac | ☐ | ☐ | ☐ | ☐ |
| 03. Mac Other | ☐ | ☐ | ☐ | ☐ |
| 04. Multi Processor Servers | ☐ | ☐ | ☐ | ☐ |
| 05. P6 | ☐ | ☐ | ☐ | ☐ |
| 06. Pentium Pro | ☐ | ☐ | ☐ | ☐ |
| 07. Pentium | ☐ | ☐ | ☐ | ☐ |
| 08. 486 | ☐ | ☐ | ☐ | ☐ |
| 09. 386 | ☐ | ☐ | ☐ | ☐ |
| 10. 286 | ☐ | ☐ | ☐ | ☐ |
| 11. Risc | ☐ | ☐ | ☐ | ☐ |
| 12. Other | ☐ | ☐ | ☐ | ☐ |

**12 Estimated gross annual revenue of your entire company/institution:** (check one only)

1. ☐ $10 billion or more
2. ☐ $1 billion to $9.9 billion
3. ☐ $500 million to $999.9 million
4. ☐ $100 million to $499.9 million
5. ☐ $50 million to $99.9 million
6. ☐ $10 million to $49.9 million
7. ☐ $5 million to $9.9 million
8. ☐ $4.9 million or less
9. ☐ None of the above

**13 Estimated number of employees at this location/in entire organization:**

| At this location: | | Entire organization: | |
|---|---|---|---|
| 1. ☐ Over 10,000 | 4. ☐ 1,000 - 2,499 | 1. ☐ Over 10,000 | 4. ☐ 1,000 - 2,499 |
| 2. ☐ 5,000 - 9,999 | 5. ☐ 500 - 999 | 2. ☐ 5,000 - 9,999 | 5. ☐ 500 - 999 |
| 3. ☐ 2,500 - 4,999 | 6. ☐ 499 or less | 3. ☐ 2,500 - 4,999 | 6. ☐ 499 or less |

**14 For which areas outside of North America do you have purchase influence?** (check all that apply)

1. ☐ Europe
2. ☐ Asia
3. ☐ South America
4. ☐ Australia
5. ☐ Middle East
6. ☐ None

B297

**Covering:** Network Architectures and Management • Routers • Muxes, Remote
Access Gear, Modems, PBXs and other CPE • Mobile Computing Products

# Candle lights AS/400 net management fire

*New software monitors more than 45 mid-range functions.*

**By Michael Cooney**
*Santa Monica, Calif.*

Candle Corp. last week announced a software package aimed at helping users manage distributed IBM Application System/400 resources.

The company rolled out the Candle Command Center for OS/400 — a server and agent software package that lets users monitor more than 45 facets of the mid-range system's networking and application operations, from system configuration and network performance to CPU and database capacity.

Command Center is Candle's flagship family of products for managing distributed resources. Its object-based Candle Technology software includes Command

Center support for MVS, Microsoft Corp.'s Windows NT and a variety of Unix flavors. The company is now expanding the family to include the AS/400.

**Closing the management gap**

"Many companies are beginning to bring the previously stand-alone, departmental AS/400s into the enterprise network but have no real way to manage them," said Wayne Walkley, Candle's AS/400 sales manager. "We are now providing a way to manage those resources from any server on the network."

IBM has some tools for managing AS/400s but lacks a central, comprehensive package. Candle, in fact, came out with a central AS/400 management offering in 1994 called Automa-

tion Center/400, which IBM had exclusive rights to sell. But the product had a number of problems, IBM fumbled its marketing efforts, and development was discontinued.

History aside, the new Command Center for OS/400 includes the Candle Management Server (CMS) for RISC-based AS/400s running OS/400 Version 3 Release 6 or higher. The offering also includes Candle software agents for RISC-based AS/400s and the older non-RISC boxes.

The agents feed important management data, such as configuration, performance and CPU status details, to the server, which then stores and displays those details on CMS.

From there, users can write automation routines that can automatically restart a failed communications device or direct traffic around a poorly per-

forming database. In addition, new devices can be brought online remotely, but configured centrally from CMS, Walkley said.

The agents can also feed their data to any of Candle's other Command Center CMS servers. This allows users to monitor their AS/400s from any of their

users," added Ken Sobel, a senior analyst at the Hurwitz Group consultancy in Newton, Mass. "Candle still suffers from the perception that it only works with mainframes — this should help change that."

The Candle monitoring agents for OS/400 will be available in March for prices starting

## CANDLE TARGETS MANAGEMENT PLATFORM MART

**Candle is looking to boost its presence in the growing management platform market by targeting Application System/400-based enterprises.**

Worldwide management platform shipments



SOURCE: IDC, FRAMINGHAM, MASS.

distributed MVS, Windows NT or Unix servers, he added.

"Being able to monitor the AS/400s centrally from the same distributed platforms users are already employing to manage the rest of the enterprise is the real value of this product for

at $2,500. The CMS should be available by April and is priced at $28,500, which includes CMS and five agents. Additional CMS licenses cost between $15,000 and $25,000, depending on the size of the AS/400.

©Candle: (800) 843-3970.

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**Net management**

# Start-up has its own designs on networks

**By Jim Duffy**
*San Jose, Calif.*

A start-up company has come out with what it believes is a better way to evaluate network designs.

Network Tools, Inc. was founded in December 1995 by a former Bay Networks, Inc. executive. Its mission is to integrate network management, Internet technologies and network modeling into an automated, rules-based net design product line.

With that in mind, Network Tools last week unveiled Caliper, a LAN/WAN design and configuration tool for users of internetworking devices.

Using a data-base of multivendor product and technology information, Caliper creates network designs from detailed rack-and-device drawings right down to the port level, along with a

bill of materials, Network Tools said.

From a Windows workstation,

**PROFILE: NETWORK TOOLS, INC.**

| | |
|---|---|
| **Founder:** | President and CEO Paul Serrano, formerly director of advanced technology sales and corporate systems engineering at Bay |
| **Headquarters:** | San Jose, Calif. |
| **Financials:** | Privately held; financed with founder cash |
| **Business partners:** | Include Bay, Cisco, 3Com |
| **Employees:** | 30 |
| **Products:** | Caliper and Virtual Agent Professional network modeling tools |

users can peruse multiple network design and pricing alternatives by describing the problems

they are trying to solve. Users define their infrastructure and service requirements, such as the number of buildings in the network, number of floors per building, data center locations, wiring requirements and user population.

Caliper then creates a drawing of network designs in minutes, and a bill of materials statement showing which components to order, where they should be installed and the cost of procurement and installation. Caliper runs on Windows NT 4.0 and Windows 95 platforms. It costs $4,995 and will be available in April.

©Network Tools: (408) 571-2600.

## INTERNETWORKING MONITOR

# Finally, Enterprise Network Accounting

L ate last month, Cisco Systems, Inc. and PBX accounting software maker Telco Research Corp. agreed to produce Enterprise Network Accounting, which basically ports PBX-style cost accounting to router networks.

The software should be greeted by network managers with a combination of relief and skepticism.

Relief is in order because the need for ENA (let's coin a new acronym while we're at it) is nothing new. It has existed since tame 3270-based corporate WANs started giving way to multiprotocol, any-to-any, LAN-to-LAN internetworks almost a decade ago.

One can't help but wonder why this took so long. WAN bandwidth of almost any description — leased, dial, ISDN or frame relay — continues to be dramatically more expensive than other core computing components, such as CPU orr disk.

Perhaps it is the nature of the revolution itself that has caused mundane issues such as accounting to be ignored for so long. Cisco and its rebellious cohorts, it seems, cared only about ending IBM's decades-long hegemony in corporate networking (done) and simultaneously eliminating the strict hierarchical networking enforced by IBM's SNA (done).

Now the accountants are joining the revolution (scary thought). Perhaps that means the revolution is over. Or it could be that the America Online debacle, currently being played out all over the U.S., has finally made vendors realize that ENA is critical and deserves more than just lip service.

Cisco may also be realizing that switched internetworking products are incomplete, to put it kindly, if they are unable to account for usage. Skepticism is in order because the companies' press release gives precious little insight into exactly what the duo has planned, and there are lots of ways to go wrong.

**Kevin Tolly**

First and foremost, if Cisco merely dumps the job of architecting ENA in the lap of Telco, we could be in real trouble. The requirements of network accounting require a fresh look, not a quick port of Telco's existing PBX accounting solutions.

The announcement cites ISDN as the first area for exploration. This could be a bad idea. The dial-up nature of the environment and, thus, its similarity to Telco's core PBX product, which produces usage and bill-back reports of standard PBX systems, could tempt the vendors into a ''port first, strategize later'' approach to get a product out as quickly as possible.

Second, we need to understand how ENA will interface with existing data collection tools and strategies. Remote Monitoring is conspicuous by its absence from the announcement. Are the vendors planning an end run around RMON? Does this mean yet another application stack residing in already feature-burdened routers?

Finally, where is the ''joint'' part of this? One would expect involvement by the Internet Engineering Task Force, other internetworking vendors or some ISDN organization. What caused Cisco to decide to go it alone? Until network managers get answers to these questions, the value of ENA is impossible to predict.

*Tolly is president of The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at (908) 528-3300 or via the Internet at ktolly@tolly.com.*

# Wide Area Networking Can be a Scary Thing.

Protocol encapsulation, configuration nightmares, performance issues, security concerns... just to name a few. And just try troubleshooting and managing this mess with something not designed from the ground up precisely for this purpose.

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| Built-in Ethernet port | ✓ | | | | |
| Easily accessible performance data | ✓ | | | | |
| LCD front panel | ✓ | ✓ | | ✓ | ✓ |
| DTE data ports available | 1, 2 or 4 | 1, 2 or 4 | 1 or 2 | 1, 2 or 5 | 1, 2 or 4+ |
| High density central site models | ✓ | ✓ | ✓ | ✓ | ✓ |
| Flash Memory | ✓ | ✓ | ✓ | | |
| Lowest cost | ✓ | | | | |

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# Carrier Services

**Covering:** Local and Long-Distance Services • Value-Added Networks • Cable, Satellite and Wireless Networks • Regulatory Affairs • Carrier-Based Internet Services

# Frame relay gets a new set of priorities

*MCI set to enhance HyperStream Frame Relay service.*

**By Denise Pappalardo**
*Washington, D.C.*

As expected, MCI Communications Corp. is adding Priority Permanent Virtual Circuit (PVC) enhancements to its HyperStream Frame Relay service. The goal? To give time-sensitive, mission-critical traffic No. 1 priority (*NW,* Jan. 20, page 1).

MCI's Priority PVC services does not give network managers a priority over others on MCI's frame relay network. Instead, net managers can give some of their traffic priority over some of their other traffic.

### PRIORITIZATION FRAME RELAY STYLE

MCI's Priority Permanent Virtual Circuit service uses a round-robin scheme that samples high-priority PVCs more often than lower priority PVCs.

▶ **High-priority PVC:** SNA, voice or video traffic is sampled four times more often than the lowest priority PVCs.

▶ **Medium-priority PVC:** LAN-to-LAN traffic is sampled twice as often as the lowest priority PVCs.

▶ **Low-priority PVC:** Service is for E-mail and other non-time-sensitive traffic.

Under the plan, users will be able to label which PVCs get high, medium or low priority and send their traffic to the appropriate connection (see graphic).

MCI's frame relay service is based on Bay Networks, Inc. frame relay switches and software, which allow the Washington, D.C.-based carrier to offer an enhanced quality-of-service level, said Todd Bahner, marketing manager of HyperStream services at MCI.

Bay's frame relay switches also support per-port buffers that let MCI more easily support individual prioritization for each PVC, said Beth Gage, broadband con-sultant at TeleChoice, Inc. in Verona, N.J. Some frame relay nets use shared buffers, she said.

Today, frame relay users are faced with committed information rate and discard eligibility as the two primary methods of prioritization. MCI's approach will let users dedicate certain mission-critical applications, such as SNA, voice or video traffic, to PVCs deemed high priority.

This may give SNA network managers who are somewhat reluctant to switch from private lines to frame relay the control they are looking for, analysts said.

In addition, some analysts and users have pointed out that similar prioritization can be achieved by using routers with sophisticated frame relay management support.

But Bahner said the service complements router-based prioritization. "Users can map their prioritization in a router to MCI's Priority PVC service and get full, end-to-end prioritization," he said.

"Routers alone cannot maintain priority levels at the egress port when there is congestion in the network, when all connections are bursting to the maximum bandwidth at that same time," Bahner said. "There is no distinction between what was deemed high priority at the switch's port," he said.

MCI will not be the only service provider with priority levels on its frame relay service for long. Service provider Interme-

*Today, frame relay users are faced with committed information rate and discard eligibility as the two primary methods for prioritization.*

dia Communications, Inc. in Tampa, Fla., also has revealed plans to enhanced its frame relay service with prioritization features based on Cascade Communications Corp.'s recently announced switch software (*NW,* Jan. 27, page 27). In addition, Sprint, AT&T and World-Com, Inc. all have stated they have developments in this area.

Priority PVC service is expected in early March, but pricing was not available. "We are not going to release pricing until we tariff the service," Bahner said.

The tariff is expected to go to the Federal Communications Commission sometime in late February. Bahner said the service pricing will be in line with MCI's existing frame relay pricing strategy.

©MCI: (800) 779-0949.

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**Telecom competition**

# AT&T tiptoes into the local marketplace

*Carrier extends outbound PBX rerouting service to local calls.*

**By David Rohde**
*Basking Ridge, N.J.*

AT&T last week took what analysts described as two baby steps forward in its entry into the local telephone business, but neither move enables network managers to drop any of their phone lines with incumbent local carriers.

In its first move, the long-distance giant said it will extend its Digital Link service to allow users with dedicated access lines to send their outbound local calls over the AT&T network.

Until now, Digital Link has enabled users to reprogram their PBXs to reroute short-haul toll calls ordinarily carried by a regional Bell operating company away from the RBOC and toward AT&T. The upgrade

*AT&T officials claimed Digital Link could benefit users in regions where businesses are charged for local calls at rates that occasionally resemble toll calls.*

extends the PBX reprogramming so that AT&T can carry outbound calls to destinations as close as across the street. But the service does not provide an actual phone line and cannot handle incoming calls or outbound 800, 411 and 911 calls.

In its second move, AT&T announced an initial business local exchange service — a program to resell Pacific Bell telephone lines that takes effect Feb. 3. But because of volume restrictions in the resale agreement between AT&T and Pacific Bell, only smaller businesses with total telecommunications expenditures of up to $2,500 a month are eligible. In December, AT&T launched a similar service for residential customers in Sacramento, Calif.

Bryan Van Dussen, director of

telecommunications research at The Yankee Group in Boston, labeled the moves an aid to "helping AT&T realize a local-entry vision [but] nothing significant" immediately for most network managers.

AT&T officials claimed Digital Link could benefit users in regions where businesses are charged for local calls at rates that occasionally resemble toll calls.

For example, under Pacific Bell's Zone Usage Measurement program, business users must pay an increasing per-minute toll as mileage increases, even within a typical local calling area.

AT&T said it would simplify users' calculations by charging a flat rate that is not dependent on mileage or time of day.

Along with the announcement, AT&T officials recalibrated the company's timetable for full local market entry. They said the introduction of Digital

Technical insights

# Building your own ADSL network

**By Tim Greene**

If you can't wait around for carriers to start offering the blazing speeds of Digital Subscriber Line technology, build a DSL network of your own.

With a pair of DSL modems and a simple copper loop between your outlying locations and your central site Ethernet switch and router, you can provide multi-megabit access for remote power users. The scheme has a distance limitation: Remote user sites and the central location must all be within a mile or two of a phone company central office. But that could work for nets within a city and certainly for campus networks, even among floors of a high-rise. Harvard.net in Boston, an early provider of DSL Internet access, uses a model that could just as easily be used in an enterprise network.

Leasing what is known as a burglar alarm line from NYNEX Corp. for $50 per month, Harvard.net creates a local loop between its downtown Boston office and the customer site. Those plain copper lines typically are used to make the connection between a customer's burglar alarm system and the company that monitors it.

Harvard.net installs a DSL modem at each end of the loop. One DSL modem is plugged into the customer PC through an Ethernet card, and the other is attached to an Ethernet switch at the Harvard.net site.

The switch interfaces with a router that has a T-3 connection to the Internet. In a private network, the router could give remote access to the corporate network or to the corporate Internet link. Hardware for the fastest DSL technology would cost less than $2,000 per line and as little as $400 for slower DSL technologies that offer speeds in the hundreds of kilobits.

So far, DSL vendors have focused on selling to Internet service providers and telephone carriers. That is because DSL is a good fit for a niche market of private networks, according to Mark Showalter, carrier marketing development manager at Ascend Communications, Inc., a maker of DSL products.

Asymmetric DSL works at 1.5M bit/sec over 18,000 feet of a local loop, meaning that for a private network, the distance from the remote site through the phone company central office and on to the enterprise central site must be less than 18,000 feet.

Also at issue is the quality of the line you get from the phone company. According to Showalter, the grade and age of the copper itself and whether the line is loaded with bridge taps and other line-enhancement equipment can affect the distance and speed at which DSL gear works. ■

## AT&T

Link local outbound calling could be considered Version 1 of the move toward a full-fledged local exchange service.

Version 2, due this summer, depends on Pacific Bell and other RBOCs offering telephone number portability so users can switch carriers and still receive incoming calls without uprooting their letterhead and advertising.

Under Version 3, AT&T would upgrade its switches to process 411, 911 and toll-free calls. Such a move is expected by the end of the year. ■

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# Special Focus

# New features keep virtual private networks vibrant

**By David Rohde**

Who needs to pay long-distance carrier tolls when you can put your company's voice traffic on a private packet data network?

The carriers hope three emerging aspects of their flagship virtual private network (VPN) offerings for large users will stop you from asking that question.

Next time you talk to your long-distance carrier about VPNs, get set to hear about manipulating network features from a PC, integration with switched data offerings and a really, really good price. These new VPN benefits should take you through your next long-distance contract renegotiation — or so the carriers hope.

### Don't get no respect

The original idea of VPNs in the late 1980s was to enable users to move intracompany voice traffic from expensive private lines to the public switched network while retaining valuable private-network features. Via routing tables in the carrier network, a call from one company location to another can be instantly recognized and charged to a special billing plan.

And because of intense competition for long-term user contracts among long-distance carriers, users these days can negotiate even on-net to off-net calls down to 7 cents a minute if total corporate volume is more than $1 million a year, or 5 cents a minute for multimillion-dollar contracts (*NW*, Dec. 2, 1996, page 1).

Yet suddenly, VPNs are the Rodney Dangerfields of the network communications arena. They rarely set pulses racing in the hypercharged world of vendor one-upmanship. They still rely on database tables located deep within the public switched telephone network (PSTN) and provide no interface to the Internet. Worst of all, the very name VPN has been expropriated by encryption and firewall vendors to mean something entirely different (see story, this page).

So carrier officials marketing VPN services such as AT&T's Software Defined Network (SDN) and MCI Communications Corp.'s Vnet are now emphasizing the inherent network management capabilities of their VPNs.

For example, users can establish calling privileges and billing codes to allow different employees a range of calling options and to cut down on toll fraud. Because the carrier can then generate a bill with an unusually fine degree of call detail reporting, corporate telecom administrators can charge back expenses to individual departments for accounting purposes.

Taking voice calls off the PSTN may reduce toll costs to zero, carrier officials say, but it leaves you vulnerable to a lack of reliable information about where your voice traffic is going.

### Do it yourself

When VPNs were first introduced, users had to call their carrier to make any feature changes in the network. But in the past two years, AT&T has introduced a series of eight tools running on Windows 3.1, and recently with an upgrade to Windows 95, that allow network administrators to dial in to the AT&T network and make changes on the fly.

The family of tools, called Customer Direct, includes modules with names such as OrderIt, TrackIt and OptimizeIt. OrderIt allows users to put new locations on the network to qualify as on-net calls. TrackIt lets users see their call detail reporting online, even before the monthly bill arrives. And OptimizeIt

**CHECKING OUT YOUR ON-NET SITES**



After logging on to the AT&T network, net managers can run AT&T's Optimize It for a graphical presentation of the connection times* generated by any on-network location.

* Measured in hundreds of call seconds

gives overall reporting trends (see graphic).

MCI took longer to provide a graphical user interface for its Vnet offering. Until last fall, MCI's ServiceView net management package provided only the capability to emulate an IBM 3270 terminal session, allowing users to note alarms in the net and open trouble tickets.

But last October, MCI introduced the Outbound Network Manager as a Windows-based module in the ServiceView family. Within Outbound Network Manager, the network administrator can call up a particular employee's telephone number, or automatic number identification, and enter a range-privilege code common to many user requests, according to Frank Nigro, MCI's senior manager for outbound marketing.

These predefined codes include "01" to allow that employee to make only on-net calls, "02" to allow on-net or off-

network calls within the U.S., and "03" to give the employee freedom to call anywhere in the world "except the top 15 fraud destinations," according to Nigro.

One of the biggest challenges for VPN network administrators is to figure out which sites to put on-network. It's not simply a matter of taking all the locations within and outside the company someone is likely to call, carrier officials explain. That's because to get the lowest on-net to on-net rates, both locations must qualify for a dedicated access line to the nearest long-distance carrier's point of presence (POP), so the long-distance carrier can avoid paying the local carrier a per-minute access fee.

Consider one of AT&T's most popular SDN features, called Location Sharing. With this feature, two companies with a large amount of traffic between them — such as a manufacturer and a key parts supplier — can recognize each other's locations as on-network. Then, whoever places the outbound call is charged at the on-net to on-net rate, just as if they were calling another cor-

porate location.

But there are two prerequisites for Location Sharing, according to Tim McDonald, AT&T manager of voice network marketing programs.
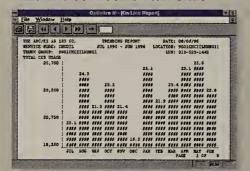
First, both locations must qualify for a dedicated access line to the nearest AT&T POP. Second, both companies must subscribe to SDN because different carriers' VPNs are not interoperable.

### Good to grow

SDN volume is expected to continue to grow for another reason: It can now be used for switched data connections, such as dial-up access to frame relay. Under AT&T's Virtual Gateway Service, users can obtain a 56K or 64K bit/sec access pipe to an AT&T frame relay switch. Instead of designating that location as a node on the frame relay network with an associated permanent virtual circuit, that connection generates only a per-minute SDN usage charge.

"It's a very popular feature," McDonald says. "In fact, there may be a waiting list for it right now." ■

## A rose is a rose is a. . .wait a minute!

**A**re you confused? Did you turn to this page expecting to read about virtual private networks (VPN), the practice of putting encrypted firewalls at Internet access points? Relax, you're not alone.

Firewall vendors and Internet service providers have popularized the term VPN apparently unaware of the fact that the same term is used for a popular long-distance service. Carrier VPNs logically define a private corporate network within a carrier's public switched network, allowing voice and circuit-switched data traffic to enjoy special routing and reporting features. In fact, the originator of the carrier-based VPN, Sprint Corp., still uses the generic term as part of the name of its product — VPN Premiere.

The double meaning of the term has not yet caused chaos in the marketplace. Frank Nigro, senior manager for outbound marketing at MCI Communications Corp., says he has not

**INTERNATIONAL REACH**

**Number of countries where the following AT&T Software Defined Network services are available:**

● Completion of calls from an AT&T domestic SDN: **270**

● Completion of calls from an SDN directly onto another carrier's VPN: **23**

● Establishment of a multicountry VPN through AT&T's WorldSource: **32**

run into the new use of the VPN term in customer discussions.

AT&T officials admit they have wondered whether to use a different label, but they tend to emphasize the company's own VPN trade names — Software Defined Network and its sister offering, Virtual Telecommunications Network Service (VTNS).

But even VTNS often goes by another name — Tariff 12. And that's a more immediate concern because AT&T, by law, must cancel by September the actual Tariff 12 and all its other tariffs on file at the Federal Communications Commission.

Not to worry, says Bob Marcucci, an AT&T VTNS marketing official. The service features will remain the same, even without the underlying government filing.

Marcucci says, "For existing customers that have Tariff 12, the deal is still the deal."

*—David Rohde*

# Local Networks

**Covering:** Servers • Operating systems • LAN management

Hubs • Switches • Adapters and other equipment

## Gigabit net start-up stresses server links

*Alteon President Dominic Orr tries to differentiate his company from the crowd.*

**Q&A**

Gigabit Ethernet products are on the horizon, and many observers believe they will be a viable alternative to ATM gear for building and campus backbones. But Dominic Orr, president of Gigabit Ethernet start-up Alteon Networks, Inc., believes the technology will make the most impact where servers and backbone networks intersect. He recently shared his thoughts on Gigabit Ethernet with *Network World* Senior Editor Jim Duffy.

**Do you see Gigabit Ethernet as an alternative to ATM?**

You have to look at the key applications — one is at the backbone, and the other is where the server intersects with the network. At the backbone level, some people think that Gigabit Ethernet will compete with ATM. Alteon's view is that at the backbone, there will always be multiple technologies — Fast Ethernet, FDDI, Gigabit Ether-

**Go online for our new virtual primer on fast LAN technologies, which includes articles on Gigabit Ethernet.**

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net and ATM — and people choose them for very different reasons. But at the server level, Gigabit Ethernet will take off in a very significant way and demonstrate a clear benefit over other technologies.

**Are there any issues that might hinder the adoption of Gigabit Ethernet, aside from standards?**

You can think about the lesson in the early days of ATM: Users got excited about the technology, but when they tested applications at 155M bit/sec, application throughput was less

than that of FDDI. And if you're not careful, this can happen to Gigabit Ethernet. A Gigabit Ethernet connection on the server might widen the pipe, but it would not do a bit of good if the server burns all of its cycles processing, or trying to process, all of the packets thrown at it at a gigabit rate. So some clever maneuvering has to be done there.

Another example is that we can make Gigabit Ethernet backbone switches, but if the router vendors wait too long to support a gigabit network interface, it would stall the market.

**Are there implementation issues with Gigabit Ethernet that are different from those associated with Fast Ethernet?**

Fast Ethernet is rapidly moving to the desktop. And like any technologies moving to the desktop, cost is the primary consideration. A lot of the emphasis on Fast Ethernet product implementation will be focusing on that. Gigabit Ethernet will be primarily focused where the server intersects with the network and on that application. The key emphasis is introducing a product that not only removes bottlenecks, but [that does not overload] the server CPU.

**How do you solve the CPU overload problem?**

We have a bag of tricks. As an example, our adapter implementation off-loads a lot of interrupts on the host. And we also dynamically adjust the workload between the backbone network and the server CPU in a heuristic fashion.

When packets are coming at such a rate that the CPU cycles are available, we will utilize more of this CPU to handle packets in parallel. If packets are coming in back-to-back while the CPU is busy, then our software and firmware help to coalesce the interrupts so the server doesn't

**Orr looks to** *score big with Gigabit Ethernet.*

need to process interrupts so frequently.

**How does Alteon differentiate itself from the scores of Gigabit Ethernet start-ups, as well as from established companies such as Cisco and Bay that are getting into the Gigabit Ethernet market?**

There are Gigabit Ethernet companies, and there are gigabit networking companies.

In the first category, I would classify everybody who will put a Gigabit Ethernet pipe into their product. And then there's the gigabit networking companies working on next-generation switching fabric that can carry truly multigigabit throughput in their products in every piece of their product structure. Alteon is one of the latter class.

[But] we are not strictly in the business of internetworking infrastructure. Where we differ is our very single-minded focus on one key issue: Next-generation [networks] will only be as effective in terms of response times and throughput as the major bottleneck will allow. That major bottleneck is where the server intersects with the backbone. ■

## IBM preps Java-based print manager

**By John Robinson**
*Boulder, Colo.*

IBM next month will ship Java-enabled software that lets administrators manage IBM network printers from a Web browser.

Based on IBM's existing SNMP-based Network Printer Management software, Web NPM is installed on a Web server and can be accessed by any browser that supports Java. No additional software is needed on the client.

With the software, administrators can track printer usage, monitor printer health and reset the device remotely, all in real time. If a printer fails, its representative icon will turn red, and Web NPM will describe the problem and decide whether human intervention is necessary.

System alerts can also be diverted to another SNMP management application such as Hewlett-Packard Co.'s HP Open-View.

IBM officials expect the Java-enhanced software will add value to the firm's Network Printer Family, which was announced last year. IBM had abandoned that market five years earlier,

instead concentrating on high-speed, high-volume production printers.

Initially, the Web NPM software will only run on Windows NT and manage IBM printers. Support for SNMP-compliant printers from other vendors is planned for later this year, as is support for the OS/2 Warp, AIX, Solaris and HP-UX platforms.

**IBM's Java-enhanced** *printer management software gives administrators a graphical view of the status of each network printer.*

Web NPM works with Web servers from IBM, Microsoft Corp. and Netscape Communications Corp.

A beta version is available for download from IBM's Web site (www.ibm.com).

The final version, due later this month, will also be available for free download, and will ship with IBM network printers.

©IBM: (800) 426-3333.

# Is Microsoft really out to get you?

**M**y favorite T-shirt is one that reads: "Just because you're paranoid doesn't mean they're NOT out to get you!"

I've been reminded of this slogan during the past week because I've come across — in three different places, from people whose opinions I value — the theory that Microsoft Corp. is not only out to dominate the computer software industry, but actually puts code in operating systems and applications that cripples products from other vendors.

I, however, chalk up the problems to software development cycles and the sheer size and scope of today's operating systems and applications.

Back in the good old days of personal computing, when DOS 3.1 was the latest PC operating system and Word 2, Quattro Pro 2, PostMark and R:Base 5 were my choices for word processor, spreadsheet, electronic mail and database, there was little talk of sabotage. Most applications didn't interact with each other and barely interacted with operating systems.

**Dave Kearns**

Then came memory managers, office suites and Windows. Suddenly, installing one thing somehow disabled something else, or running two applications simultaneously would cause problems although each would run if it were alone.

With Windows 95, we can add to the mix 16- and 32-bit applications that can cause problems in previously unknown ways. One of the biggest problems is the redistribution by multiple vendors of common library files (Windows Dynamic

## Tip of the week

*If you purchase computer equipment for yourself or your company, visit www. onsale.com, site of three-times-a-week online auctions of refurbished and new gear.*

Link Libraries are the most common). It's a frequent occurrence for a new application to come with an older version of the common library than you already have installed.

Most installation programs will warn you before overwriting or deleting a file, but not all do.

I came across two more examples this week. In the first, an application I was installing also installed a Web browser. It happened to be an earlier version of a browser I already had on my drive but, nevertheless, it went blithely on its way without giving me the opportunity to stop the activity.

In the second, a new network client installation deleted files for another net client, disabling the previous product.

Is this Microsoft sabotaging Netscape and Novell? Nope, it's CompuServe, Inc. overwriting Internet Explorer 3.1 with a 3.0 version, and Novell deleting files for Microsoft's Client for Novell Directory Services while installing its Client32 for Windows 95.

If you still think that Microsoft is out to get you, though, head over to www.tiac. net/users/billg40/main/index.htm.

This site, The Secret Diary of Bill Gates, should give you plenty of ammunition to prove your point.

*Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at dkearns@ msn. com.*

---

# Catch of the Day.

Introducing a fresh approach to enterprise Universal Access.

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# Client/Server Applications

**Covering:** Databases • Messaging • Groupware
Conferencing • Imaging • Multimedia • Development

## Intersolv tool kit offers solution to component development riddle

*Allegris Constructor is designed to make building distributed applications easier.*

**By John Cox**
*Rockville, Md.*

Take your pick of cliches. Piecing together distributed line-of-business applications from ready-to-use software components has until now required either blood, sweat and tears, or smoke and mirrors.

But Intersolv, Inc. thinks it has a better idea in Allegris Constructor.

The tool kit employs a BASIC-like scripting language as well as a set of graphical editors that let developers use mouse clicks to link C++ and OLE software objects to create distributed applications. The company has also packed code generators and messaging middleware into the tool kit.

A later release will generate Java code and ActiveX Controls, and will support both Microsoft Corp. and Netscape Communications Corp.'s Web interfaces. The tool set currently lacks support for object request brokers. And for some specialized application features, users may have to write C++ code by hand.

"It has the potential to be a blockbuster product, and it should be on everyone's shortlist [for possible purchase]," said Curt Monash, president of Monash Information Services, a Lexington, Mass.-based technology research company. "Intersolv has done a nice trade-off — being fully object-oriented [in Allegris] without having a steep learning curve."

Equally important, observers said, is a set of powerful, integrated products. These include an application for designing object and data models, an object-oriented repository for storing models and components, Intersolv's PVCS software config-

uration management product for handling component changes, and a partitioning facility to spread finished code over client and server computers.

Other elements are transaction messaging middleware, based on PeerLogic, Inc.'s Pipes product; code generators for C++, HTML, SQL and the Pipes communications code; and a set of third-party ActiveX Controls for accessing an array of Internet protocols, such as File Transfer Protocol and Multipurpose Internet Mail Extensions.

Allegris Constructor fits with Allegris Workshop, a lower level tool set for professional C++ developers, and Allegris Foundation, a core set of ready-to-use application functions in the form of C++ class libraries.

"Allegris encourages and rewards good, object-oriented programming disciplines," said Glenn Miller, director of research and design at Optinfo Co., a Charlotte, N.C., developer of custom object-oriented business software. "The result is we've achieved a very high level of software reuse in our applications. In some of them, [we've achieved] as

> *"It has the potential to be a blockbuster product, and it should be on everyone's shortlist [for possible purchase]," said Curt Monash, president of Monash Information Services.*
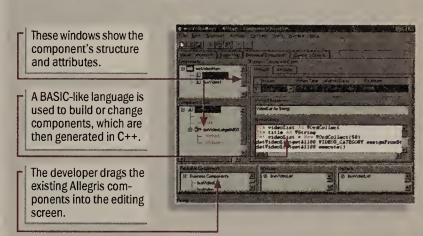
much as 70%."

Reuse is the Holy Grail of object programming because it lets developers build applications much more quickly.

"Allegris Constructor lets you drag and drop components on to different clients and servers, and it generates all the necessary [communications] code," Miller said. "That makes it extremely useful for applications that must be scalable."

Allegris Constructor is currently available on Windows NT and 95, as well as a range of Unix

### INTERSOLV'S ALLEGRIS COMPONENT TOOL SET



- These windows show the component's structure and attributes.
- A BASIC-like language is used to build or change components, which are then generated in C++.
- The developer drags the existing Allegris components into the editing screen.

The Allegris tool set gives application developers a full set of object-oriented tools, including C++ and middleware generators, to build complex distributed applications.

Intersolv has aimed Allegris at mainstream business applications, where companies that have been relying on traditional, two-tier client/server tools are experiencing problems as their

systems. It supports the popular Web servers and relational databases.

Prices range from $1,999 to $3,999 per developer.

©Intersolv: (301) 838-5000.

## Document management suite debuts

*PC DOCS blends workflow and imaging into bundle.*

**By Paul McNamara**
*Burlington, Mass.*

Aiming to add muscle and versatility to its popular document management product, PC DOCS, Inc. last week began shipping DOCS Enterprise Suite.

The suite combines workflow and imaging capabilities — DOCS Routing and DOCS Imaging — with an enhanced version of DOCS Open, the company's established document management offering.

New DOCS Open features include expanded APIs for manipulating images and work-

> *PC DOCS believes the scalability and flexibility of its suite give it a competitive edge over rivals.*

flow; an Open Text Retrieval API to support full-text engines from the likes of Fulcrum Technologies, Inc. and Excalibur Technologies, Inc.; as well as full-text indexing of Chinese, Japanese and Korean.

PC DOCS believes the scalability and flexibility of its suite give it a competitive edge over rivals such as Documentum, Inc., Novasoft Corp. and Saros, a division of FileNet Corp.

DOCS Enterprise Suite costs $499 per client, with servers starting at $3,995.

©PC DOCS: (617) 273-3800.

## SHARED LOGIC

# Taking note of Lotusphere '97

**L**otus Development Corp. last week took the plunge into standards-based clients at its Lotusphere '97 conference, building on decisions made last year to divide the once-monolithic Notes product line into Domino server and Notes client brands.

Two new client releases are planned: one code-named Lookout in the first half of the year and one code-named Maui in the fourth quarter. Lookout will have Post Office Protocol 3 (POP3) and Lightweight Directory Access Protocol (LDAP) support, while Maui will add Internet Message Access Protocol 4 (IMAP4) and probably Secure Multi-purpose Internet Mail Extensions and Secure Sockets Layer 3.

Domino server release schedules will be decoupled from Notes client release schedules, making rollouts at once more dynamic and confusing.

From the high end to the low, the Lotus client continuum will consist of Notes Designer, Notes Desktop, Notes Mail, Lotus Mail, Notes Weblicator and Lotus Mail Java Edition. There will also be a big

**Daniel Blum**

push on Java and on more modular software component approaches.

Long term, Lotus Mail will replace cc:Mail as Lotus's entry-level mail client. Despite this, the company will continue supporting existing cc:Mail customers by issuing Release 8 this quarter and will even upgrade the cc:Mail DB8 Post Office, eventually enabling access to it via POP3, IMAP4 and LDAP. Lotus' customer-friendly migration strategy holds true across the board. Plans call for compatibility among Notes 3.X and 4.X, Lookout, Maui, and other clients and servers.

Having dealt with the important customer impact issues, let's go to the track and speculate about how Lotus will perform in its race against various native Internet E-mail packages.

According to Lotus Executive Vice President Mike Zisman, "It's a lot easier for us to build the protocols than it is for them to build in the features and functions we already have in Notes." However, for many customers, the race is not about high-end groupware, but basic mail with or without low-end groupware.

Lotus needs to move down-market and compete against the likes of Netscape Communications Corp. and Qualcomm, Inc. for small to midsize customers. Another major focus will be to make the Domino server much easier to install and maintain.

There's also a race on to build high-end, scalable enterprise messaging servers and backbones. Here, Lotus faces

Hewlett-Packard Co., Microsoft Corp. and others. Lotus will need to improve its service and support as well as scale Notes server capacity higher, which is where the growing synergy between Lotus and parent company IBM comes in.

By 1998, the protocol races will be over and customers will have won. You will be able to mix and match messaging clients and servers from virtually all vendors. But according to the Notes gurus, one thing will not change: "Lotus clients combined with Lotus servers will still provide a better solution together than they will when mixed with other systems."

*Blum is a principal at Rapport Communication, a consultancy that focuses on messaging, groupware and electronic commerce. He can be reached via E-mail at dblum@mindspring.com or via the World-Wide Web at www.rapport.com.*

# Intranets & the 'Net

**Covering:** Internet Technologies and Services
for Collaboration and Electronic Commerce

# 'Net tax confusion

*Tax collectors try to apply existing laws to the Internet.*

**By Todd Wallack**

Forget all the talk surrounding new Internet taxes. The real mess is trying to square existing tariffs with the 'Net.

"What we have is a new industry and a bunch of old laws," said Tracey Edwards of Big Six accounting firm Deloitte & Touche. "It's pretty confusing."

Take Internet service providers, for instance. Tennessee classifies them as telecommunications companies, just like AT&T and BellSouth Corp., and says they should collect state sales taxes. But New York a few weeks ago declared that ISPs do not sell telecom services and should be exempt. Other officials said ISPs should be classified as utilities. Most states, such as Alabama, are not sure what to do.

The quandary affects network managers in two ways. First, as tax collectors ratchet up their collection efforts, managers could wind up paying more for everything from Internet service to routers ordered via E-mail. Second, as workers do more business via the 'Net, companies need to consider the tax implications involved.

"The questions of taxation are very complicated and can have a tremendous impact on the financial health of a business," said *Cyberlaw* author Jonathan Rosenoer. "The worst thing would be to have IS people making decisions they are not competent to make."

But the issues will not go away if we ignore them.

"It's not a question of whether or not the industry should be taxed," said Verenda Smith of the Federation of Tax Administrators in Washington, D.C. "As businesses expand into this area, they come under a number of different existing tax laws."

Perhaps the most nettlesome taxes are sales and usage.

Most Internet businesses, such as bookseller Amazon.com, said they follow the same rules as traditional mail-order firms: Collect sales taxes in states where they have a "business presence."

"We're just like L.L. Bean, Lands' End and Gateway [2000]," said Amazon.com spokeswoman Jennifer Cast.
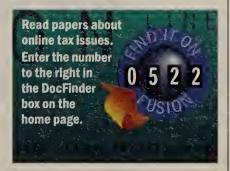
But the Multistate Tax Commission has argued that Internet businesses effectively have a business presence everywhere and should always collect local sales taxes. To be safe, Cisco Systems, Inc. does just that.

But everyone from New York state to software vendors has challenged this definition — and has left the situation murkier. Do you need a distant server in a region to collect taxes? Employees? Offices? You may get a different definition of business presence from every state, Edwards said.

General Electric Co. said the issues are so cumbersome that it will likely hire an outside firm to write the tax calculation software for its trading network.

Meanwhile, states are considering stepping up their efforts to

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collect little-known "usage taxes." Companies are supposed to pay the tax in lieu of sales taxes when they buy out-of-state goods, but states have historically been lax about enforcement. The surge in electronic commerce, however, could force officials to take another look.

"Obviously, it's impractical to enforce it at every level," said Kevin Quinn of New York's tax office. "But we certainly need to...monitor it."

Still, government officials say they want to be careful not to disrupt growth in the fledgling industry. The White House, for example, issued a preliminary report last December arguing against any new taxes. ■

# EDI lurches toward the Web

**By Ellen Messmer**
*St. Paul, Minn.*

With all the hype, you would think everything was happening on the World-Wide Web. But when it comes to electronic data interchange, companies still mostly use traditional value-added networks (VAN) or private lines rather than the Internet.

But when an EDI veteran such as Monsanto Co., a giant in agricultural and chemical products, starts sharing X12 EDI data over the Web, can the rest of the world be far behind?

For the past few months, Monsanto has received shipping status information from its freight carriers by means of a Web-based EDI service from St. Paul Software, Inc., an EDI translation software supplier. Monsanto is still sending more sensitive purchase information over a VAN.

The EDI service, called Web EC, lets the shipper use a Web-based form to fill in the information Monsanto needs. The Web EC server then sends the HTML form to an HTTP server, which St. Paul Software calls its service bureau. There, the HTML form is translated into X12 EDI format and sent over a VAN to Monsanto.

Alternatively, the service bureau could send the EDI form directly over the Internet. The Web EC service could also convert customer orders placed on electronic catalogs into EDI purchase orders, said St. Paul Software President Gary Anderson.
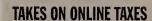
Many users question whether the open Internet is reliable or secure enough for sending critical EDI business data. Monsanto shares those concerns.

Elizabeth Kaufman, systems analyst in charge of Monsanto's EDI operations, said the firm currently restricts use of the Internet to shipment data, which is considered less sensitive than information such as purchase orders.

But Monsanto does require a shipment status message for every shipment, and if small freight carriers cannot afford EDI software, they have been offered the choice of St. Paul Software's fax-to-EDI service in the past, and now the Internet EDI service, Kaufman said. ■

**St. Paul Software's** *Anderson says, "Web EC lets companies surpass the cost and complexity issues associated with EDI."*

## TAKES ON ONLINE TAXES

| Report | Author | Summary |
|---|---|---|
| "Logging On to Cyberspace Tax Policy" | Interactive Services Association | Internet access should not be impeded by new taxes or expansive interpretation of old ones. But if new taxes are necessary, they should be simple, uniform across geographical boundaries and easy to collect. |
| "A Framework for Global Electronic Commerce" | Clinton administration | New taxes should not be imposed on Internet commerce. But governments should be able to apply existing tariffs, as long as they are simple and do not significantly impact the industry. |
| "Improving New York State's Telecommunications Practices" | New York State Department of Taxation and Finance | ISPs do not sell telecommunications services and therefore are exempt from New York taxes. |
| "Sales and Use Tax Ruling" | Tennessee Department of Revenue | ISPs sell telecommunications services and therefore must collect Tennessee sales taxes on installation, monthly and hourly fees. |

# Do we have your number?

**F** or the past few years, the InterNIC has been administrating and registering IP addresses for North America, South America, South Africa and the Caribbean. The Internet Network Information Center got its authority to assign IP addresses from the Internet Assigned Numbers Authority in conjunction with a cooperative agreement between the National Science Foundation (NSF) and Network Solutions, Inc.

Initially, NSF provided funding to Network Solutions to support the domain name and IP address services. This was migrated to a fee-for-service model for domain name registration in which a fee that averages $50 per year has been charged per domain name.

A membership organization, the American Registry for Internet Numbers (ARIN), has been proposed to take over these IP address administration services from the InterNIC. ARIN would be a nonprofit corporation with a volunteer board of trustees and an advisory council selected from the membership.

Although the initial board and advisory council members would be selected by those proposing the organization, future members would be selected in a way that would in-clude direct input from the membership.

ARIN would charge membership and administration fees to cover the costs of its operation. The size of the administration fee is based on the size of an Internet service provider's address allocation because it is a generally reliable way to predict the level of services the ISP will require from ARIN.

Because ARIN would be a nonprofit corporation, the amount of the fees would be adjusted so the revenue matched the expenses while maintaining a small cushion for emergencies. These fees would mostly fall on the larger ISPs, since they request allocations directly from the registries. The cost to end-user organizations, which usually get their addresses from their local ISP, would be only a few dollars per year — generally less than $10.

**Scott Bradner**

ARIN would not "sell" IP addresses. It would follow the guidelines in RFC 2050 to ensure that the IP Version 4 address space is carefully administered and assigned in ways that minimize the growth in the size of the tables in the Internet backbone routers. ARIN would also operate the nameservers that support the reverse lookup function whereby an IP address can be turned into the name of the computer to which it is assigned.

There have been some scary stories propagating around the 'Net about ARIN, mostly saying that small ISPs will be forced out of business because of excessive charges. These stories wildly exaggerate the effect of the ARIN proposal, which for small ISPs would be on the same order as those for end-user organizations.

ARIN is an effort to create an independent organization that can maintain impartiality in the allocation and conservation of IP addresses while ensuring that IP address allocation and management are collectively handled by the users of the IPv4 address space.

Disclaimer: Harvard is not in the business of assigning numbers (it uses letter grades), so the above are my opinions. But it should be noted that I've been asked to be an initial ARIN board member.

*Bradner is a consultant with Harvard University's Office of Information Technology. He can be reached via the Internet at sob@*

# What if you could get heavy duty for the price of regular strength

More precisely, what if you could get carrier strength switching that ends up costing less than a conventional solution. Presenting the Alcatel 1100 HSS™ multiservice switch from Alcatel Data Networks. This is the heavy duty technology that will take you to broadband. Depend on it to powerfully manage services, skillfully avoid rush-hour congestion, flexibly support the standards and protocols you need, and most importantly, pay for itself in the process. To learn more, call **1-888-ADN-2500** or (703)724-2878, or visit http://www.adn.alcatel.com.

**ALCATEL**

# Technology Update

Keeping Up with Network Technologies and Standards

*Ron Nutter, a Master Certified Novell Engineer and Groupware CNE in the Lexington, Ky., area, tracks down the answers to your questions. Call (800) 622-1108, Ext. 476, or send your questions to rnutter@world.std.com.*

**We are upgrading several NetWare 3.12 and 4.1 servers to 4.11. We installed the servers with a 10M-byte DOS partition, which has to be increased to 14M bytes for NetWare 4.11.**

Can you recommend a utility or suggest a way to increase the size of the DOS partition without losing any data?

**Chuck Jones, assistant technical coordinator, Sullivan County Schools, Nashville**

You might be able to use a program called Partition Magic from Power-Quest Corp. of Orem, Utah. This program lets you resize partitions on the fly without losing data (as long as the size you shrink the partition to is larger than the amount of data residing on the drive).

However, I don't know if the program has been tested with NetWare partitions. You should check with PowerQuest for references; if it has any, find out what their experiences have been. To be on the safe side, before using Partition Magic or a similar program, make at least two backups.

You may find it easier to delete the DOS and NetWare partitions and recreate them in the size you need. I recommend a DOS partition size of at least 25M bytes. At 14M bytes, the minimum partition size doesn't leave a lot of room for add-ons. When you set the partition size to a value greater than 14M bytes, you'll have flexibility if the minimum size of the DOS partition goes up again.

Some net planners advise that the DOS partition have enough free space to meet or exceed the amount of RAM in the server. Their reasoning is that if this much free space is available, you can direct a memory dump file there instead of to a floppy drive.

I usually don't follow this suggestion since the dump file created by NetWare doesn't tell you much, and you typically have to send the box of diskettes to Novell, Inc. for analysis anyway.

# Tapping into PCI through I/O switching

*New technology eliminates unnecessary protocol translations, breaks through switch-to-server bottleneck problems.*

**By Simon Fok**

As today's networks evolve into high-bandwidth multimedia applications and client/server architectures, switch-to-server interconnections are limiting throughput.

But a new technology, called I/O switching, can alleviate the problem.

The difficulty is easy to characterize: Many companies have centralized critical network resources — such as file servers, disk storage and tape drives — in the data center. At the same time, these companies are migrating to higher speeds across the LAN, replacing 10M bit/sec shared media with dedicated 10M/100M bit/sec switched connections.

When application requests from multiple high-speed links converge at the backbone to vie for server bandwidth, server connections can quickly become saturated.

Ironically, servers with PCI buses are capable of raw I/O throughput of 132M byte/sec, or 1.05G bit/sec. But when they connect to the network through Fast Ethernet or FDDI connections that max out at 100M bit/sec, or even through 155M bit/sec ATM links, the server's network interface card (NIC) must throttle the gigabit I/O throughput to adapt to the slower network media. The server's actual capacity for throughput remains untapped.

**A systems approach**

I/O switching eliminates unnecessary protocol conversion and boosts server bandwidth to gigabit levels. It extends the PCI channel from the server across the LAN link, effectively importing the PCI bus into the switch itself. The I/O overhead of PCI-to-LAN media conversions is eliminated on both the switch and server sides, freeing the connection from throughput constraints imposed by slower LAN media.

Most network designers equate higher performance with faster transport media, while most systems designers think in terms of faster system buses. In practice, however, performance is a function of all the contributing elements.

If I/O throughput has a direct impact on overall network performance, and network media is incapable of supporting the full I/O capacity of a server bus, the result is a self-perpetuating cycle of inadequate performance. I/O switching takes a systems approach to I/O bottlenecks by matching switch-to-server throughput to server bus capacity.

**PCI extension**

Traditionally, servers are connected to networks through a NIC that plugs into the server bus and supports a particular network media, such as Fast Ethernet or ATM. A media card on the switch side connects to the server NIC through a media cable and transfers data from the server to the switch backplane.

In the I/O switching approach, these two interfaces are collapsed together. An I/O interface card plugs into the server PCI bus and connects through a 50 twisted-pair cable directly to the switch fabric, bypassing any intervening media translations.

By extending standard PCI, the server can blast data directly from its bus into the switch — switch-to-server data transfers become PCI bus-to-bus transactions.

The only media translation occurs at the outbound switch port, once the I/O request has been processed by the switch (see graphic). These outbound ports can support any standard LAN media, including ATM, Ethernet, Fast Ethernet, FDDI or Gigabit Ethernet.

In addition, I/O switching takes into account the limitations of the server software architecture.

In shared-media networks, the server software does not need to support the full capacity of the PCI bus since the network cannot approach PCI speeds. As networks are evolving to gigabit levels, operating systems and CPUs of host systems are left to play catch-up. I/O switching off-loads much of I/O processing overhead from the server CPU and operating system to optimize switch-to-server I/O transfer.

The result is gigabit switch-to-server throughput today. I/O switching can support the full 1.05G bit/sec burst capacity of the PCI bus and delivers a sustained switch-to-server throughput of 600M to 700M bit/sec full duplex. I/O switching offers 10 times faster performance than

FDDI and Fast Ethernet, whose theoretical 100M bit/sec tops out in practice at 40M to 60M bit/sec.
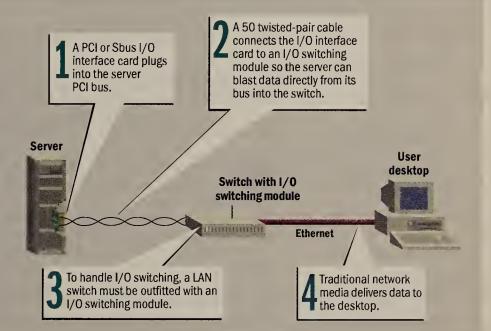
Current tests with Sbus server architectures have yielded a five-fold increase in switch-to-server throughput with I/O switching, compared to NIC-based connectivity options.

I/O switching's systems approach to high-speed throughput works with a full range of I/O devices, including Ultra Fast SCSI II or III storage devices. Once a server has located the required information in backup storage, the peripheral device can download the data directly to the I/O switch using native SCSI signaling, thereby eliminating the unnecessary overhead of transmitting the data back through the server connection.

By taking a systems view of performance that optimizes existing and emerging I/O standards for high-speed networks, I/O switching can virtually eliminate switch-to-server bottlenecks across the evolving network landscape.

*Fok is chief executive officer and chairman of GigaLabs, Inc., a Santa Clara, Calif., company that integrates networking and I/O technologies. He can be reached at (408) 481-3030 or via the Internet at sfok@gigalabs.com.*

## UP CLOSE
### Extending PCI to the switch

I/O switching technology collapses the functions of the network interface and switch media cards into a single I/O interface. The interface extends the PCI between the switch and server, eliminating the need for intervening network protocol translations.

**Here's how an I/O switching system is architected:**



1. A PCI or Sbus I/O interface card plugs into the server PCI bus.

2. A 50 twisted-pair cable connects the I/O interface card to an I/O switching module so the server can blast data directly from its bus into the switch.

Server

Switch with I/O switching module

User desktop

Ethernet

3. To handle I/O switching, a LAN switch must be outfitted with an I/O switching module.

4. Traditional network media delivers data to the desktop.

## What's right and wrong about E-mail

A good columnist makes you think, so I applaud Wayne Spivak for last week's column "Defending spam, plus survival tips for a spam-filled world" (page 40), which got me thinking about how messaging is used.

I'm not talking about SENDING MESSAGES IN ALL CAPITAL LETTERS or using those damned emoticons or phrases such as (GRIN!) after an obviously stupid sentence. (This is the electronic equivalent of the guy who whacks you on the arm and says, "Hey, just kidding!" after an insulting remark.) Miss Manners has already addressed cyber-etiquette in a new book.

What intrigues me is where the boundaries of propriety lie in the business use of messaging. What's the appropriate use of E-mail to solicit business, conduct research, or create awareness of your company and products?

I can't share Spivak's enthusiasm for nearly unbridled use of E-mail, as anyone who's read my earlier column can attest (see "Learning to hate E-mail," July 8, 1996, page 30). But I also don't side with the people who violently overreact to any unsolicited missive.

So what's kosher? Consider some messaging issues we've encountered lately:

● Last week, we received a message from a gentleman who objected to "unsolicited commercial E-mail" from one of our reporters. The reporter had plucked the addresses of 15 users from a newsgroup and sent the people questions regarding a story she was preparing. She didn't want to post the questions for fear of tipping off competitors. Was her approach inappropriate?

● Each week, we send tens of thousands of copies of InFusion, an electronic newsletter highlighting stories and resources on Network World Fusion (www.nwfusion.com). We think you want to know what's new, but it doesn't take the proverbial rocket scientist to figure out that a secondary goal is to increase traffic on the site and make advertisers happier. The number of people who complain about InFusion is quite low. (Although one very angry recipient, who had difficulty unsubscribing, wanted to charge us $1 for each piece of mail received.) As more companies market their Web sites, you'll be getting more of these electronic missives. Should you?

● A couple months back, we set up a moderated E-mail discussion forum, called the Intranet Business Group, to foster discussion among people building intranets. To get the group rolling, we pulled addresses from a number of internal sources using criteria that indicated involvement with intranets. So far, we've heard few complaints from the folks we signed up, but were we presumptuous?

Where do you draw the lines? I'm soliciting your response.

*John Gallant, editor in chief*                    jgallant@nww.com

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*Totally Unplugged • Ira Brodsky*

# The RBOCs have an unfair advantage? Think again

Ⓐ major premise of modern telecommunications policy is that the regional Bell operating companies possess what in regulatory parlance is known as an unfair advantage. However, I suggest just the opposite is true: With competition looming in local phone markets, the future of RBOCs is in serious jeopardy.

Government policy makers are fond of saying how, while we all desire competitive local phone markets, you can't get there from here — at least not directly. Only through careful regulation, they caution, can we prevent RBOCs from exploiting their formidable advantages — their vast cable plant, powerful switching fabric and huge base of customers — to crush potential rivals.

Perhaps it is time to reevaluate these advantages.

The RBOCs' cable plant is predominantly composed of twisted-pair copper wire. Today, practically all urban areas are blanketed by cellular telephone and cable TV services. Competitive access providers (CAP) such as Teleport Communications Group have constructed fiber-optic networks to serve large end-user organizations. WinStar Communications, Inc. promises to extend the reach of the CAPs' networks via its radio-based Wireless Fiber service.

Wireless carriers are preparing to enter local phone markets. The cellular duopoly — a limited competitive environment established by decree of the Federal Communications Commission — is being joined by as many as six personal communications services (PCS) operators per city. By law, PCS networks must employ spectrally efficient digital transmission. The inescapable conclusion is that we will soon have enormous wireless capacity — far more than warranted by the mobile telephone market alone.

AT&T, Sprint Corp. and MCI Communications Corp. have each crafted wireless strategies for infiltrating local phone markets. Using its cellular and PCS properties and dual-band handsets, AT&T hopes to weave together a nationwide wireless telephone service. Sprint is even better positioned; it is building a nationwide PCS network that will work with smaller, less expensive, single-band phones. Meanwhile, MCI is reselling cellular services and has struck a deal to purchase airtime from PCS licensee NextWave Telecom, Inc.

Nor is there anything exclusive about the RBOCs' switching fabric, since PCS operators are building their own advanced networks.

Lucent Technologies, Inc. furnishes the 5ESS switch as part of its PCS infrastructure package — the same switch it sells to RBOCs.

In fact, PCS networks are arguably more advanced; most operators throw in caller ID and voice mail notification for free, and inbound PCS calls automatically find users anywhere within the network.

Yes, RBOCs still control access to the majority of telephone customers, but they are not nearly as dominant as they once were. There are now more than 40 million cellular subscribers in the U.S. And the coming PCS-cellular price war is going to add tens of millions of people to wireless subscriber rolls.

Some RBOCs pretend they are unafraid of competition — they simply want rules barring their participation in long-distance and cable TV markets rescinded. But the sad truth is RBOCs have much more to lose than to gain. In order to enter the intensely competitive long-distance market, they will have to give up a largely captive local phone market.

Furthermore, RBOCs have little experience competing. And they are unlikely to gain such experience soon: The Telecommunications Act of 1996 reaffirmed that they must provide other carriers with access to their nets at fair prices. It is difficult, to say the least, to compete against vendors that enjoy guaranteed access to your service platform.

It is not written in stone that RBOCs must fail. But the only way they can succeed is by cannibalizing their own business — hard as that may be to swallow. Because if they don't, someone else will.

*Brodsky is president of Datacomm Research Co., a Wilmette, Ill., consulting firm. He can be reached via the Internet at ibrodsky@ix. netcom.com.*

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**MESSAGE QUEUE**

*Send letters to nwnews@nww.com or John Gallant, editor in chief, Network World, 161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification.*

### School of thought

Ira Brodsky's column "Are public schools grooming CIOs or computer jockeys?" (Dec. 16, page 38) contains some misconceptions and misinformation.

In my opinion, learning to use a keyboard, save files and use an application does not dull the minds of potential "information technology leaders." This learning provides the gateway for further exploration. I don't know of any schools that teach these skills as an end in themselves.

Brodsky states that many teachers want to make education fun and hands on and to use alternative assessments.

# Cost of ownership is new vendor battlefront

**I**f the phrase "total cost of ownership" (TCO) hasn't yet rolled off your tongue, it soon will. TCO has become the latest battlefront in vendors' struggle for market share in network-based computing. Vendors such as Hewlett-Packard Co., IBM, Compaq Computer Corp. and Digital Equipment Corp. are eschewing the traditional battle of the bits in favor of watching the wallet.

Corporate executives are looking for a way to rein in costs while increasing the business value of computing platforms and applications. Hardware, software and even component vendors are responding with a number of initiatives to lower TCO.

A prime example is Intel Corp.'s Wired for Management initiative. The basic premise of Wired for Management is to make computer components smart enough to help manage the overall computing environment. Intel's management-enabled products range from chips and motherboards to application software.

What's more, as a founding member of the Desktop Management Task Force and a key supporter of the Desktop Management Interface, Intel is solidly behind instrumented hardware and software, which communicate their system resources for interoperability and management. (For more information about Wired for Management, check out Intel's white paper at http://www.intel.com/managedpc/intro.htm.)

With such management-enabled technology at the heart of their products, PC and server companies such as Compaq, HP, IBM and Digital are each laying claim to the title of TCO titan. All build additional system manageability features into their products, making it easier to maintain and support distributed hardware from a centralized point, and thus reducing administration costs.

The network computer (NC), spearheaded by Oracle Corp., takes another stab at the TCO issue. The NC's tack is to recentralize most applications and processes onto powerful servers and use the Internet (or your own intranet) to deliver Java applications to the desktop. The thought is that lobotomized desktops will require less administration and, thus, save money. However, some analysts believe the administrative costs will simply shift from the desktop to the server.

Gartner Group, Inc. is the one consulting firm that routinely tries to establish a figure for TCO. Gartner Group looks at four categories of cost factors in a system's total cost: capital, administration, technical support and end-user operations.

TCO is inherently hard to measure because computing carries so many intangible costs. For instance, what is downtime worth? The answer, of course, is: It depends. How much does technical support and training cost? These costs can vary widely from company to company and even from department to department within a company.

Technology innovations for managing TCO, particularly the jointly developed ones, should be lauded. But applying technology to the TCO conundrum is just one approach. Perhaps a better approach is simply to follow a set of "best practices" as you make your purchase decisions and implement your network.

First, purchase high-quality equipment from as few vendors as possible, ideally only one. Standardize on only a handful of configurations. Limiting your configurations will limit your support requirements. Also, check your vendor's policy for building machines using standard compatible components.

Vendors that aren't quality-oriented will cut costs by buying components from a variety of manufacturers, and these components may be incompatible.

Second, look for proven, compatible solutions that minimize your risk of implementation. The leading server companies all have test labs that enable you to test your planned network configuration before you install it in your production environment. Take advantage of these labs to work out the glitches before you buy.

Third, purchase from vendors that believe in innovation through industry standards. You don't want to rely on proprietary solutions, no matter how cost-effective they may appear at first.

Fourth, look for vendors with close industry alliances that enable joint research and development, not just joint sales and marketing efforts.

For instance, Compaq and Microsoft Corp. have a Frontline Partnership Agreement that dates back several years. Under this agreement, the two companies conduct joint research and development intended to optimize each other's products and reduce incompatibilities.

Buying the best technical computing solution for your needs and buying the system that most decreases your TCO do not have to be mutually exclusive endeavors. In fact, quite the opposite is true today. Some of the best technical advances are those that make the system more manageable and less costly to own and operate.

*Musthaler is vice president of research at Currid & Co., a Houston-based technology consulting firm. She can be reached at (713) 789-5995 or via the Internet at linda@currid.com.*

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This is true, and yes, some teachers (including me) openly disdain standardized tests. As for the academic performance of American pupils, this has been improving for quite some time.

Brodsky also assumes that the vast majority of households not only have computers, but that students are allowed to use them. With the level of poverty in today's public school population, this can hardly be true. And although the computers students are using today will be obsolete when they enter the workforce, the basic concepts will not be.

Teachers in public schools have not abandoned education to computers; they are teaching students to use them as tools for lifelong learning.

Readers interested in the application of technology to enhance education might consider finding a copy of *T.H.E. Journal* and do a little reading

before allowing Brodsky to sway their opinions.
*Carl Bogardus*
*Technology instructor-coordinator*
*Chaparral Middle School*
*Chaparral, N.M.*

Ira Brodsky hit the nail on the head: A solid basis in liberal arts, not the ability to point and click, is the most important educational foundation.

But I wish Brodsky had taken the point even further. He does not mention that someone needs to design and produce these computers, networks and

so forth. This requires a strong mathematical and technical education.

Silicon Valley is filled with foreign-born and -educated engineers. The overriding common denominator among them is an excellent mathematical and technical education. The U.S. has been fortunate to attract and keep many of these people, but this is not a certainty forever.

The key for the next generation is a well-rounded education, with more emphasis on mathematics and other technical disciplines. We need to educate and foster creators, not just users.
*Philip Schrupp*
*Software engineer*
*Cisco Systems, Inc.*
*San Jose, Calif.*

As one who has responsibility for numerous Unix enterprise servers in a very large company, I am constantly amazed at the lack of communication and problem-

solving skills among so-called computer-literate people.

Educators, teach your students how to communicate (orally and in writing) and develop their problem-solving

skills. The computer is a tool for accomplishing this.
*Steven Harlow*
*Senior systems engineer*
*Hughes Technical Services Co.*
*Long Beach, Calif.*

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# INTRA Net

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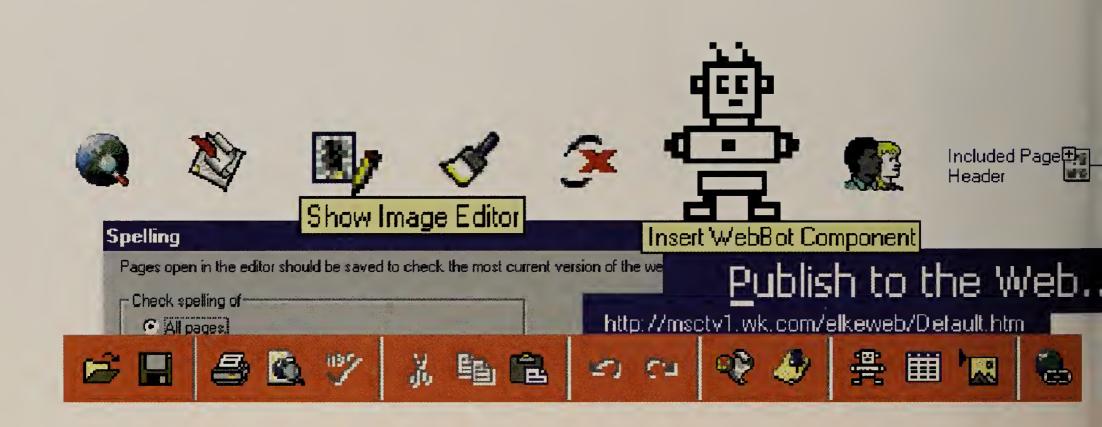
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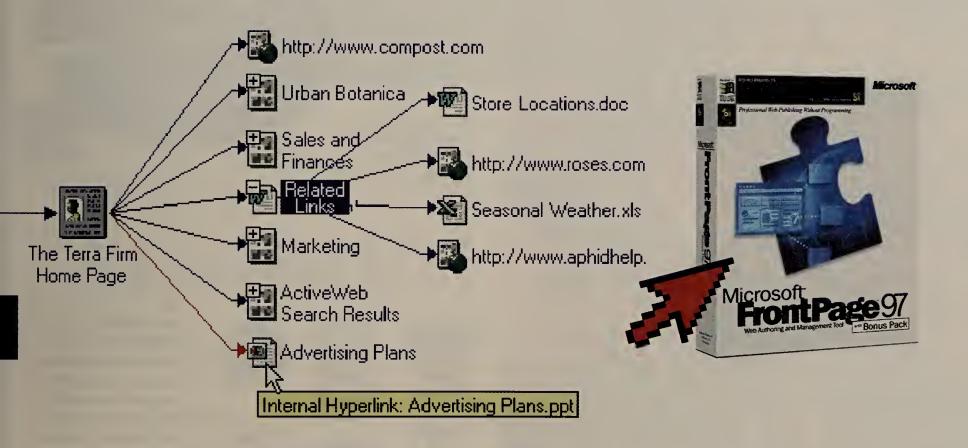
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Maybe you're not ready to wrassle computer gibberish to the ground and make it cry uncle. (Or <B>Uncle!</B>, as it more likely would say.) That's okay—the new Microsoft® FrontPage™ 97 Web authoring and management tool has everything any Webmaster needs, and it lets you skip right to the fun stuff. For starters, you can use Web wizards to begin building your site. Create instant hyperlinks. Without a whit of programming know-how, call on WebBot™ components to add interactive features. Spell check across your entire site, instead of page by laborious page.

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# IntraNet

## From the Editor

You've all heard the teamwork patter: If we work together, we'll get the job done more quickly, for less cost, with better end results. So, come on, let's get together on this. Rah, rah, rah!

This kind of thinking works at some companies, but at many more, it's hard for employees to swallow. Narrow-mindedness thrives in corporate America. Who wants to share the glory (and the monetary bonus) of a project done well?

So what's going on with intranets? The story is pretty much the same at company after company: A core group of organizers invites anyone interested to participate in an ad hoc intranet planning meeting after work one day, and the company cafeteria gets more crowded than it does at noon on Taco Tuesday.

A doctoral student looking for a good collaborative case study would have a heyday sorting through all the intranet team efforts. There have been few, if any, single undertakings that have generated such enthusiasm and volunteerism as corporate Web projects.

The reasons are as numerous as the intranet home pages being posted. Employee empowerment is a big one. The desire to have fun and be creative is another. And what about the need to be hip? The World-Wide Web is everywhere; why not at work, too?

Who knows, maybe a huge amount of pent-up camaraderie has simply found its release valve. But who cares. The point is that these massive collaborative efforts are here. The million-dollar question really is whether companies can keep the politics and departmental wranglings away from this incredible corporate asset.

*Beth Schultz*, Executive Editor (bschultz@nww.com)

## Staff

# hot links

## Worldly hiring on the intranet

There, tacked underneath the schedule for the corporate fitness center's step aerobics class is the latest internal job postings bulletin — as if anyone interested could find the listing, let alone study it out in the open.

It's amateurish internal recruiting efforts such as these that start-up company world.hire wants to end.

Using the corporate Web for job recruitment is the way to go, says Hank Stringer, chief executive officer at world.hire. The company is developing a suite of tools firms can use to qualify job applicants, route qualified resumes to the hiring authorities, send E-mail responses to the candidates and track activity.

"We're automating more than 75% of the work that recruiters do," says James Hardie, executive vice president at world.hire.

The world.hire recruiter software, for example, will include a job-referral module. The tool will time-stamp the referral and

E-mail a thank you and a notification if the recommended candidate is hired, Stringer says.

The software will link to existing corporate databases, such as personnel systems maintained by human resources, to store information on applicants. "The system is candidate-driven," Stringer says. "Job candidates have to know that their resumes aren't going to be retrievable by their managers."

The company expects to conclude beta tests by month's end. The software, written in Perl for Unix systems, will cost about $4,000 per server. A version for NT is in the works. Users need Netscape Navigator 2.0 or equivalent browsers.

## Give me two of these, three of those

*New application handles corporate purchases over the intranet.*

Intranet shopping is becoming a reality, thanks to a joint venture by Chase Manhattan Bank and British software company BVR LLC.

From a corporate Web site, users will be able to access the application to check equipment catalogs and inventory, then place and track orders via their browsers. Built-in authentication will verify a user's identity and authority to place an order.

The Java-based application is the first product of the joint venture, a new company called Intelisys Electronic Commerce LLC (intelisys.net). Intelisys expects to ship the application this quarter following beta tests that are under way now, says Robert Barnes, a BVR cofounder and vice president of product development at Chase.

"Suppliers can update the online catalog by getting into the intranet in a sort of demilitarized zone, a secure area," Barnes says.

## Zooming in on directories

A master map to help intranet managers survey and sail a typical sea of network directories is available in a new product dubbed a meta directory.

Zoomit VIA builds a directory of directories for an intranet, drawing information from such sources as local and World-Wide Web pages, network operating systems and applications that maintain their own directories.

The program, now shipping from Zoomit Corp. (zoomit.com), doesn't just synchronize directories by grouping a user's different IDs.

Instead, it creates a single code object that represents all of an individual's identifiers across the network, and stays linked to the original data for updates.

Zoomit VIA includes directory management and security tools. Management agents are available to integrate most existing directories, and programmers can modify agents to integrate custom directories.

Zoomit VIA also supports replication and real-time interaction with directories, and follows the Lightweight Directory Access Protocol.

The package runs on Microsoft Corp.'s Windows NT and Windows 95 platforms. The server software, management agent tool kits and client software for 250 users costs $2,500.

An additional 250-user license costs $2,000.

## Take a bow, InfoWeb

*TRW Space & Electronics Group wins award for its intranet home page.*

When TRW Space & Electronics Group (S&EG) set out to establish an intranet presence, the goal was to make the network fun and easy to use. Employees have praised its efforts, and now so has the business unit in Redondo Beach, Calif., received the Award of Excellence in the Mixed Media Production: Web Sites category.

"Web Sites is a brand-new category, beginning this year, which makes winning an ACE award in this category very special and exciting," says Dan Sheehy, manager of internal communications for TRW S&EG.

After reviewing dozens of Web sites, Sheehy determined: "The good home pages were easy to use, colorful and had graphics that represented the business the company is in."

Sheehy settled on a spacecraft theme for InfoWeb. He then decided on the top and lower layer links from the home page with the goal of making it as easy as possible to find information. (See "Shooting for the Stars," a case study in the December 1996 issue of *IntraNet*, page 28.)

**HOME PAGE** TRW S&EG

*InfoWeb*

*Intranet home pages need to be fun, exciting and informative, says Dan Sheehy, manager of internal communications for TRW S&EG.*

International Association of Business Communicators.

The association's Los Angeles chapter last month gave TRW S&EG highest honors for its intranet home page, called InfoWeb, in its annual Award for Communications Excellence (ACE) competition. The TRW

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# Cookies: Feeding session information from Web servers to clients, and back

BY MARK GIBBS

You want to allow a user to browse a catalog and select items from different pages, but how do you track the choices? A selection made on one page is, as far as the server is concerned, unique and unrelated to any previous or subsequent requests made by the same user.

The answer is to have a Web server back-end application monitor user actions, and one of the most successful techniques for this is something called cookies. Created by Netscape Communications Corp., cookies are now a de facto standard.

But before we discuss what cookies are, we need to explain the context of the problem.

Web client/server relations are pretty simple. The browser says to the server: "Get me such and such a document." If the document exists and the user has permission to retrieve it, the server obliges. That's pretty much all there is to it.

Communications overhead is slight and performance is good, but there is one problem: A relationship exists between the browser and server only for the duration of a transaction, and each transaction stands alone. (The technical term for this kind of transaction is idempotent, and the server is called stateless.)

Actually, this is only a problem when you need to track a browser session, a sequence of Web server requests generated by a single user.

Prior to cookies, the only way to track user sessions was to use the limited "hidden fields" feature of HTML forms or a custom back-end process on the server to manage "tokens" embedded in URLs. This is a complicated and, unless you are careful, fragile system.

## The cookie monster

Netscape tackled the problem with the release of Navigator 0.94, which included a feature called "persistent cookies."

Rather than use data passed back and forth between the browser and server as the means of keeping state, Netscape decided to make it possible for the Web server to store and retrieve a small amount of data — that's the cookie — in the browser's file system.

The cookie data, for example, could identify the user, a session (where we're tracking a user but we don't know who he or she is) or anything else a system designer would want.

To make the process of setting and retrieving cookies transparent to the user, Netscape implemented an extension of HTTP, the Web's native communications protocol.

HTTP is, on the whole, a fairly simple protocol. When a browser makes a request, the server responds with a header followed by the requested data. The header itself consists of multiple labels. If the server is attempting to set a cookie on the client, a "Set cookie" label is included.

For a detailed structure of the cookie header, see the sidebar below.

## In the cookie jar

Cookie storage depends on the browser and platform involved. Browsers supporting cookies include most versions of Navigator after Release 0.94, most versions of Microsoft Corp.'s Internet Explorer and quite a few more (see research. digital. com/ nsl/formtest/ for an exhaustive list).

## ASK DR. INTRANET

David Morro is in for consultations. He'll help diagnose your intranet ailments, recommend corrective measures or answer your questions. Message him at dr.intranet@nww.com.

**What's the difference between Java and JavaScript?**

Besides the fact that Java and JavaScript can both be used to add functionality to intranet sites, the two are only loosely associated.

Java is a complete object-oriented, general-purpose programming language, similar to C++, that can be used to create full stand-alone applications. More commonly, Java is used to write platform-independent miniapplications typically stored on a Web server. Called applets, these miniapplications are automatically downloaded and launched when a user connects to a Java-enhanced intranet. Popular Java applets include simple games, live sports scoreboards, stock tickers (see item below) and animated graphics such as a twirling company logo.

JavaScript, on the other hand, is a scripting language more easily comparable to HTML than to any true programming language. It is meant to be an easy-to-understand language nonprogrammers can use to enhance Web pages with increased functionality such as the ability to run error checks when a user submits a form.

When embedded in an HTML page, JavaScript adds the same kinds of smarts previously only attainable using Common Gateway Interface scripts.

For more information on Java, go to javasoft.com on the World-Wide Web. For complete documentation on JavaScript, check out home.netscape. com/ eng/mozilla/2.0/handbook/javascript/index.html.

**I've heard that a lot of companies include up-to-the-minute stock information on their intranet home pages. How is this accomplished?**

To provide real-time (or close to real-time) stock information on your intranet you need two things. First, you need a client program to retrieve, process and display the stock data. You can get the details on an online stock ticker Java applet on the Web at javasoft.com/applets/applets/StockDemo/details. html. Other applets and ActiveX controls for displaying stock information are available from different sites around the Web.

Second, you need a source of continuously updated stock information, such as the stock price servers maintained by Quote.com and PCQuote.

To get the stock data, you connect the applet to the URL of such a server. You program the applet so it retrieves the stock information from the server at intervals of your choice.

For more information on using Quote.com or PCQuote as stock price feeds, surf to quote.com/ marketing/QLive/index.html and pcquote. com/ msexcel/cgi-bin2.htm, respectively.

Morro is a Web architect at Interse Corp., a Sunnyvale, Calif.-based Web development firm.

## COOKIE RECIPE

The contents of the Set-Cookie header are as follows:

Set-Cookie: NAME=VALUE; expires=DATE; path=PATH; domain=DOMAIN_NAME; secure

The NAME and VALUE are any strings you wish to use to identify the cookie data. They must exclude semicolons, commas and white space. NAME =VALUE is the only mandatory component.

DATE indicates the date after which the cookie is to be automatically removed. If no expiration date is set,

then the cookie will only exist for the duration of the Navigator session (that is, until you exit the browser).

PATH is used to specify for which paths or subpaths of a given URL the cookie is valid. For example, a cookie would be valid if the browser requests http:// www. gibbs. com/ somestuff/ mydoc.html and there is a cookie specified for the domain www. gibbs. com with the path "/some,", then the cookie will be valid.

DOMAIN_NAME is the name of the domain to which cookie applies. If this

parameter isn't specified, it defaults to the name of the server that issued the Set-Cookie header.

The "secure" parameter controls whether a secure link is required before the cookie can be sent to the server.

Note that a server can issue multiple cookies in a single header, but they must apply to different URLs and paths. Otherwise, only the last duplicate cookie will be set.

For more information about cookies, try Andy's Netscape HTTP Cookie Notes at illuminatus.com/ cookie.fcgi.

The Netscape specification for cookies allows the browser to store a maximum of 300 cookies with up to 4K bytes per cookie. There is also a limit of 20 cookies per server or domain, with fully qualified hosts and domains being treated as separate entities.

The Netscape specification says servers "should not expect clients to be able to exceed these limits. When the 300 cookie limit or the 20 cookie-per-server limit is exceeded, clients should delete the [oldest] cookie."

The Netscape Navigator cookie file (cookies.txt) is stored in the Navigator subdirectory. The actual layout of this file is proprietary and, unless you want to invalidate the cookies, you shouldn't alter them. But there's nothing to stop you.

Under other browsers and operating systems, cookies will be stored in different places and in different ways. For example, on the Macintosh with Navigator, cookies are stored in the Navigator folder, while Microsoft Internet Explorer stores them as shortcuts in a subdirectory.

Note that the actual names and values of cookies are set by the server, and unless there's some significance to the text, at the browser end you have no idea what the meaning of the cookie is.

### Feeding cookies

But why would the server want to use cookies?

Well, say you want to present Web pages that are tailored to a user's preferences. You could record that preference in a cookie on the system. Then, whenever the browser accesses the server, you need to be able to examine that cookie data.

Actually, the server doesn't retrieve the cookie: When a cookie-enabled browser requests a URL from a Web server in a given domain, it first checks to see if it holds a valid cookie (one that is not expired) that matches the domain and URL path to the server.

If a valid cookie exists for the target server, the browser adds a special header label, HTTP_COOKIE, to its request and follows it with the cookie name and data. A back-end application on the Web server can retrieve this, which is created automatically by the server's Common Gateway Interface.

A frequent concern is whether cookies are safe: Can cookies reveal your disk contents or other potentially sensitive information?

The answer is no. All that is transferred to and from the client is the cookie data — no other data is accessible to the server.

However, If you decide to use cookies to track users, you would be well advised to encrypt any cookie data that you intend to be private because it can be easily read on the browser's system. Better still, consider sending something like a pointer to a record in a database on the server rather than the data itself.
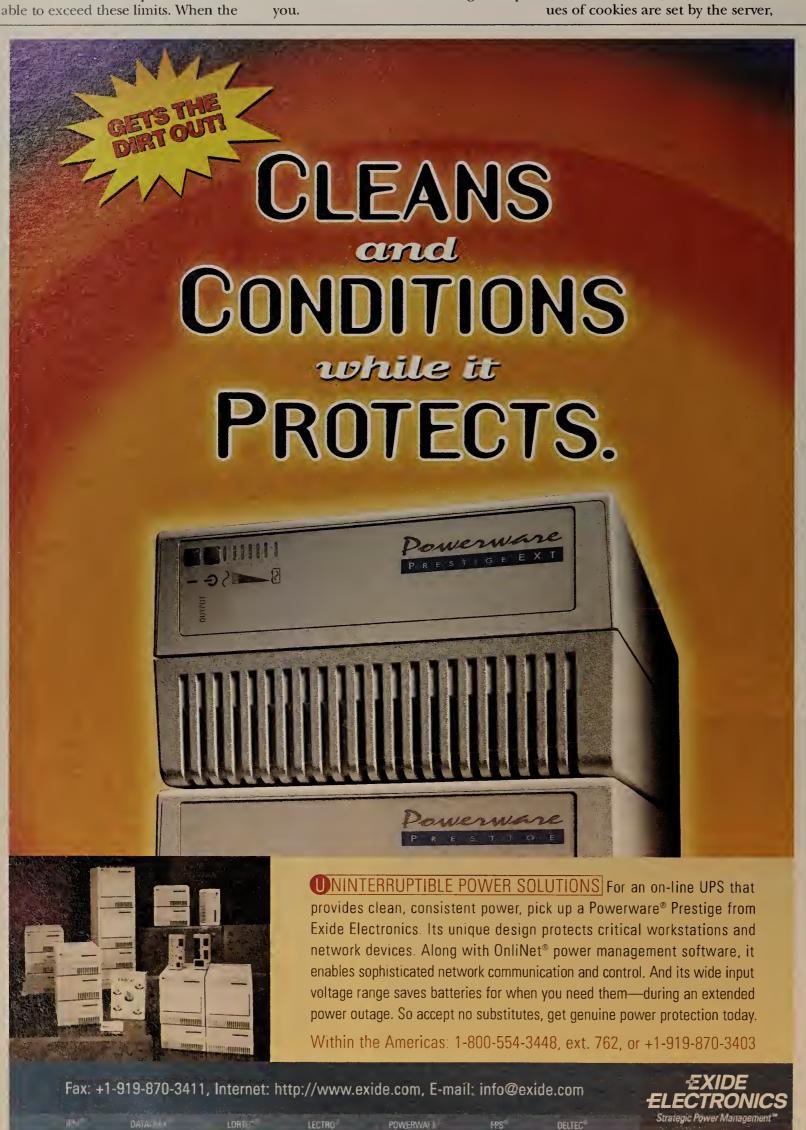
The only time you would have to send the data itself would be if you were setting a cookie to be retrieved by another server — a technique that might be useful in an intranet environment for tracking users across multiple servers.

### Standard wrapped cookies

Although cookies are a de facto standard today, they are on their way to becoming de jure standards. The Internet Engineering Task Force is considering a draft for cookies under the much more formal name of "HTTP State Management Mechanism" (see portal. research.bell-labs.com/et for cookie information and examples).

One issue we haven't dealt with that always comes up when cookie technology is discussed: Why did Netscape call them cookies?

Well, with cookies we can solve the mystery of what users are doing, but the name mystery will remain just that because Netscape simply says it was "for no compelling reason." Such is the world of high-tech computing.⊜

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# FutureTense's Texture 1.0:

## Get the look and feel you want

BY MARK GIBBS

n your intranet, you can do whatever you want. If you violate every design rule that applies to building public Web sites, no problem.

On the Internet, bandwidth is at a premium, and the person browsing your site might be using a PC that only has enough processing power to drive a pocket calculator. It follows that you better be careful about what content you offer.

But on your intranet, you more or less know what users have in terms of processor, memory and connection speed. If you want to burn bandwidth and processing cycles to achieve a particular look and feel, more power to you.

But what can you use to get that gloss and glitz? Standard HTML will take you only so far, while some of the top-end multimedia tools are overkill for many organizations.

FutureTense, Inc., a new entrant in the Web content development and presentation market, has launched a product that fits the bill. It is called Texture, and if rich document content and slick presentation are your primary goals, but you don't want to spend the rest of your career mastering an authoring package, it's worth a look.

Texture provides a complete Web document creation and presentation system that will make sense to anyone who has used a layout tool like PageMaker. But unlike with Page-Maker, the end result is a document that is highly interactive.

### Texture context

For Texture to be of use, your user population will need Java-enabled browsers. The Texture system itself consists of a Windows 95 or NT drag-and-drop WYSIWYG editor for creating document layouts and a viewer applet that allows Java-enabled browsers to interpret and display the documents.

Texture includes an applet viewer, so you can preview documents without a browser. This also is done from within the editor, called Future-Tense Designer, for proofing documents.

Installation of Designer is simple, but not quite so straightforward for the browser viewer applet. For this, you need to unpack the supplied archive files, and then copy the resulting directory structure and files to your Web server

document tree so the Java-class files can be found.

Unless you are quite familiar with your Web server and how applets are referenced in HTML documents, this operation might be somewhat aggravating.

I found that simply copying the viewer files and subdirectories into the document root, and then copying the supplied example files to the root, resulted in a working configuration. Once you've established something that works, reorganizing it to meet your target setup isn't too difficult.

### Feeling the texture

FutureTense Texture documents are actually descriptions of the layout of objects in a document and how they behave. The viewer applet is responsible for the interpretation of the Texture document objects and rendition in the browser.

You might compare this to the kind of layout specification that you create when using PowerPoint — the data files are a description of the screens that are interpreted by PowerPoint and rendered on demand. Texture uses a similar model but with a richer set of objects.

When you start Designer, you are presented with a simple layout screen. By default, the Project Manager dialog box appears and helps you open an existing project or create a new one — although this dialog can be disabled.

Each document is treated as a project, and this creates both files and subdirectories under the project's private subdirectory.

The document's background color can be specified with the document size — the height and width of the design screen can be specified to exact numbers of pixels, allowing you to create documents for specific screen resolutions from as small as 10 by 10 pixels right up to 2,000 by 2,000 pixels.

Unfortunately, there is no means in this release to dynamically change object attributes such as the size, position or colors of the document window or objects in it.

### Document creativity

When you create a Texture document, you

create two files in the current project directory: an .ftl file, which lists the document objects, and an HTML document that launches the Texture viewer applet and specifies the .ftl file to display.

Two subdirectories also are created: "Copied," which contains all of the text and HTML files used in the document, and "Pfr, " which contains compressed versions of the fonts your document uses.

Fonts are an interesting feature of the Future-Tense Texture system. Whenever you specify that one of the Type 1 or TrueType fonts on your system is to be used in a Texture document, and you save the document, copies of all the fonts you've used are copied into the Pfr subdirectory.

When users view the document, they will see the fonts you specified. FutureTense refers to this feature as NetFont technology. The only downside is that downloading even compressed font information can be time-consuming; that must be weighed against the impact of strong typography. Once again, on an intranet, the downloading limitations are much less of a consideration than they are on the public Internet.

Seven kinds of objects can be added to a Texture document: a text object, an image, square-cornered and rounded rectangles, ovals, timers and hyperlinks.

Timers specify when events that affect objects will occur, while square-cornered and rounded rectangles and ovals are simply for row info.

For an intranet, Texture is a strong candidate as a primary vehicle for slick presentation delivery. It is simple, robust and effective — definitely worth hanging off your intranet tool belt. ⊜



TEXTURE  FutureTense

The Texture publishing tool can be used to create interactive sites like the one shown here.

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## PROS AND CONS  FutureTense's Texture

**Pros**
▶ Provides an easy way to build professional-looking, interactive documents
▶ Features a good user interface
▶ Is simple to use and robust

**Cons**
▶ Doesn't go far enough in its range of attribute controls
▶ Has some minor documentation weaknesses

### RATING

| | |
|---|---|
| Value for money | 3 |
| Intranet usefulness | 5 |
| Quality | 4 |
| Overall | 4 |

1 is poor and 5 is excellent

**SUMMARY:** This is an outstanding concept and first product for Web publishing that meets and exceeds many of the basic needs for creating documents with a slick look and feel.

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Circle Reader Service #1

# Everyone's fighting infoglut, trying to get intranets in order

### BY PEGGY WATT

Feeling a little too connected? Your E-mail box overflows every day, your intranet grows more and more robust and complicated with every heartbeat, and the virtual World-Wide Web universe keeps expanding. Information at your fingertips? Your fingertips can't possibly type that fast!

Microsoft Corp., which both promised and trademarked "Information at your fingertips," is among the many intranet-minded developers hoping to give your digits a break. Information-management tools aren't new, of course, but there seems to be a new urgency concerning these products, each of which approaches the management problem differently, depending on the application category.

### Collaboration tools

Microsoft (microsoft.com) is touting its updated Office 97 suite, which is scheduled to ship this month, as especially intranet-friendly because it produces HTML output, supports Web-style hyperlinks among documents and has a new groupware application.

"All Office documents have a Web toolbar, so users can navigate Web documents within Office," says Michael Graff, a group product manager in Microsoft's Desktop Applications Division.

The basic Office 97 suite includes Word, Excel, PowerPoint, Access and Outlook, which is a new client in-box, contact manager and scheduling program. Outlook replaces Schedule Plus, which was bundled in earlier releases of Office.

Office 97 will be available in versions for large corporations, small businesses, users and developers.

The Office applications also have new non-Web functions such as IntelliSense, which identifies a user's work habits and anticipates actions to ensure faster response; a new Office Assistant, which offers custom tips and help; and an improved drawing function, called Office Art, which can be called from within any of the programs, Graff says.

The retail price for Office 97 Standard Edition is $249. Upgrades are free to current Office users through March.

Wall Data, Inc. (walldata.com) also is extending its application- and data-sharing technology, Salsa, with intranet-oriented functions.

Last month, the company shipped Salsa Application Viewer, which supports a new file type that users can post on servers, embed in HTML documents or attach to E-mail messages. Users automatically activate the appropriate Salsa application to view the file; they don't need to know where on the intranet the application resides.

"Users can run the application, print a report, query data, do predefined imports and interact with the file however they need to," says Trevor Rubel, product marketing manager with Wall Data.

Salsa Application Viewer costs $49 per user and comes with an application launcher.

### Web servers

The Web server is just the bare bones of what you need to run an internal Web — the so-called extras are becoming necessities. Database links, management tools and robust search engines are becoming essentials, and the selection and quality are growing.

Innotech Multimedia Corp. (innotechcd. com) boasts an early implementation of Java technology in its NetResults tool set. NetResults draws on Innotech's history of developing text search and management functions to accompany CD-ROM resources, says Simon Arnison, the company's vice president of research and development.

Innotech redesigned its indexing model to use Java, and NetResults can handle both text and HTML data. Support for other data types is in development.

The NetResults suite includes the Administrator's Tool, which generates an index of information stored on any Web site. The index is about 80% of the size of the original data. The Administrator's Tool is available for Windows 95 or NT, but the NetResults server can run on any operating system along with the Java Virtual Machine.

The server monitors client access and manages search queries. The NetResults server can be set to restrict access to certain indexes, depending on user privileges. Java's multi-threading capability makes simultaneous search operations feasible, Arnison says.
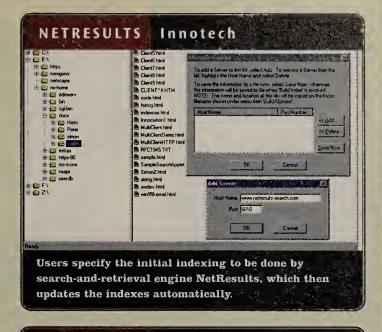
NetResults also includes Java applets that are downloaded to the client. The applets can be generated by the server (search engine), and Innotech is making the NetResults programming interface open so users can create their own templates as Java applets, Arnison says.
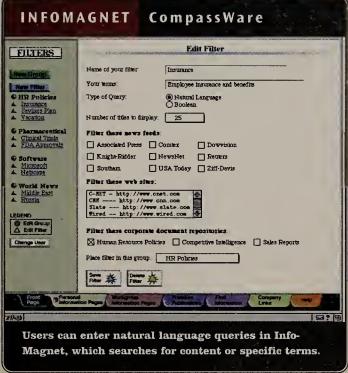
NetResults supports Boolean logic, multiple word searches and weighting. It also allows cascading searches.

Search results can be displayed in several formats, including a graphical format that shows a chart of which documents generated the most hits, or matches, and a simple format that shows only the URL of the document with a match.

The NetResults site license costs $1,995 for unlimited clients.

CompassWare Development, Inc. (compassware.com) applies its original InfoMagnet technology to help filter searches of various data types so users can customize their queries.



Users specify the initial indexing to be done by search-and-retrieval engine NetResults, which then updates the indexes automatically.



Users can enter natural language queries in Info-Magnet, which searches for content or specific terms.

InfoMagnet relies heavily on context search information, and lets users tailor each query by further filtering a search. It can search a variety of data types, including HTML pages, word processing documents and downloaded newsfeeds. Database search functions are in development, says Jeffrey Cordisco, vice president of sales and marketing for CompassWare.

The InfoMagnet search functions emphasize natural language queries, although they support Boolean functions, Cordisco says. But the search engine indexes documents with emphasis on the frequency and position of words, so users can weight their query terms with greater success, he adds.

InfoMagnet includes a Windows NT-based server application that handles information retrieval from static documents, with an information routing tool that checks dynamic data such as newsfeeds and Web sites. Users can access the server through a standard browser. The administrator controls access through the existing database restrictions.

InfoMagnet is scheduled to be widely available for beta testing this month, and is expected to ship this quarter. Pricing will be $4,995 per server, with enterprise user licenses starting at $100 per server. ⊜

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# Pushing BACK



## Broadcast technology streamlines intranet traffic.

**BY PEGGY WATT**

It's Monday morning, and when the marketing manager loads his browser, a small dialog box opens with must-see messages: A bulletin with a URL for a partner company's Web site, a human resources memo about changes to the 401(k) program and, in red, an alert about a departmental meeting and a hotlink to documents to review beforehand.

Welcome to the world of digital broadcasting on the intranet.

This so-called "push" technology is hot stuff these days, even if the term is something of a misnomer. The marketing manager invited all these broadcasts, one way or another. He subscribed to the partner's Web site, the department head put him on the meeting list, and HR assembled a list of employees participating in the 401(k) plan — the guy in the next cubicle doesn't participate, so he didn't get the bulletin.

The ability to target broadcasts nicely comple-

ments the pull nature of intranets. The server pushes data — in the form of E-mail, a pop-up dialog box or a streaming message — to those users who should get it or who want it. This means remote workers get bulletins about local training sessions and childless workers don't get reminders to turn in paperwork for pretax day-care payment plans.

Push and pull implementations take many forms, says Jerry Michalski, managing editor of RELease 2.0, a newsletter from EDventure Holdings in New York. Selecting the right kind is key to acceptance. "If I put an entire article in front of your eyes, it's a hard push. Sending a URL is a soft push, as is caching the article on your machine and letting you choose to click to read it."

E-mail is a push technology because mailing lists can help filter messages. The literal-minded suggest that any store-and-forward system could

be considered push because it builds a queue of information that's transmitted to specific recipients. Indeed, some agent technology that automatically checks Web sites for updates could fit into a semi-push category.

But sophisticated publish/subscribe technology (a more accurate, albeit longer, description than push) is a Web-centric combination of user filters and server broadcasts. Using it efficiently can result in better use of bandwidth and targeted, timely data for users.

### Getting the word out

"I'm totally infatuated with this whole broadcast idea," says David Chaplin, manager of information technologies at KPMG Peat Marwick LLP's Montvale, N.J., offices. "It's a proactive approach of getting information to people. It's much more effective than them having to go

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**workflows**

somewhere and say, 'I wonder if anything's new?'"

Like many early users of push technology, KPMG is using it to disseminate information that is culled from several sources. The company subscribes to WavePhore, Inc.'s satellite newswires, which are filtered at the corporate server and broadcast to users. The information also is staged on the corporate server for users to search and retrieve.

lin's staff is evaluating several new products, including start-up Marimba, Inc.'s Java-based Castanet, which distributes targeted transmissions and automatic software updates across an internal net.

It also is looking at PointCast, Inc.'s new intranet-oriented Pro-Server, which integrates with WavePhore's technology to mix Web and satellite feeds. PointCast is the oldest and possibly best known of the young but growing field of subscribe/broadcast products. Late last year, the company started wooing intranet business, expanding its Web-transmitted screen saver approach to let corporations plug in their internal, targeted transmissions.

PointCast's I-Server lets companies add a corporate channel to the PointCast transmissions distributed internally. Pro-Server, scheduled to ship this quarter, enables multiple streams of filtered WavePhore data feeds for targeted distribution over an intranet.

"Companies want control and to be sure of the worth of a network's content, whether it's the World-Wide Web or an intranet," says Jaleh Bisharat, PointCast vice president of marketing.

She credits the product line's scalability and its easy integration into existing systems with its acceptance. For example, administration tools allow content management by a central site or individual departments.

Early tester MCI Communications Corp. found the I-Server interface easy enough to give individual departments access to and control of their own content. The test was MCI's first experiment with broadcast technology, but the company has pledged to implement it for all 40,000 intranet users.

"This is a good solution for sending out updates on policies or group information," says Dan Toohey, manager of intranet services at MCI in Reston, Va.

### The place to be

PointCast popularized the concept of Web-based broadcasts by enabling users to download free subscription software and instead charging the information providers (particularly advertisers). Many broadcast developers have followed that lead, charging for server software or information feeds, but offering the receiver software free.

Like other early vendors in the field, PointCast focused first on Internet broadcasting and has expanded to intranet-specific services. IT departments can expect other existing broadcast technologies to evolve for intranet usage, as well as some new targeted broadcast aimed straight at the intranet.

Start-up Diffusion, Inc., for example, expects to ship this quarter Intra-Express, a push/pull alignment tool that can reach users however they choose — from E-mail to dialog boxes to faxes, and even pagers.

IntraExpress acts as a traffic cop, routing information to users as they wish to receive it, says James Gagnard, Diffusion's president and chief execu-

tive officer. Users can request Web site content, corporate database records or other information, and receive it when they want it and in the format they choose. The program also can interface to Notes and most E-mail systems.

Gagnard calls the approach "co-active information delivery" and positions it as an alignment of so-called pushware and pullware.

"The roles and needs of the information providers and the recipients change all the time," Gagnard says. Users can change their delivery choices as needed, and can even request that duplicate copies go to different sources at different times.

"Allowing the recipients to decide how they want to get the information increases the likelihood they'll read it," says Les Sparrey, director of value-added reseller channel marketing for Ascend Communications, Inc. in Alameda, Calif. He sends broadcasts to his sales organization via the company's virtual private intranet.
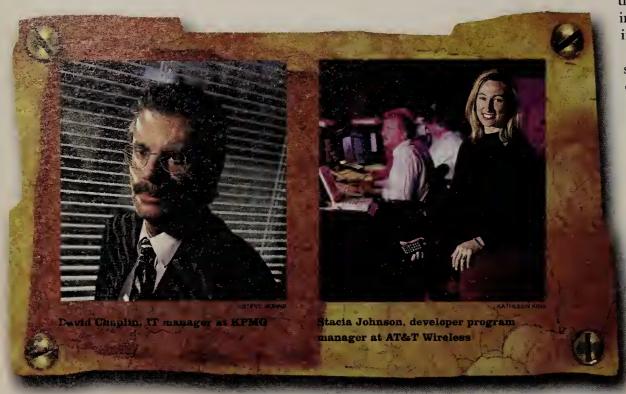
Taking the more common route to the intranet by way of the Internet is start-up Intermind Corp., which last fall introduced its Intermind Communicator client software and Global Publisher server component.

Intermind was quick to get more than 100 commercial Web sites such as the Spiegel Catalog and Silicon Valley Bank, to display its Intermind Hyperconnector icon. From the icon, Communicator users subscribe to sites and get updated or specific information. Notification icons pop up in subscribers' browsers to alert them of news.

The Hyperconnectors help raise Intermind's profile on the Web, but more users may eventually run the technology on intranets, says David Arnold, Intermind's president.

Users aren't flagged whenever a Web page changes, but when changes concern a specific topic or happen at designated times, Arnold says. And the kind of flags a user requests can provide useful feedback to data providers.

The AT&T Wireless Services Data



David Chaplin, IT manager at KPMG

Stacia Johnson, developer program manager at AT&T Wireless

The corporation already uses Knowledge Manager, a messaging and conferencing application that's part of SoftArc, Inc.'s FirstClass groupware suite, to support a kind of push technology: It has an auto-open option for E-mail messages that "hits users in the face" with urgent broadcasts, Chaplin says.

But don't get too pushy, he warns. A must-read dialog box should be applied judiciously, or users will be irritated and tune it out.

KPMG is starting to broadcast internal Web-based content, such as reports and messages, as it builds the KWeb intranet that will eventually serve some 17,000 users around the world. Chap-

## SUBSCRIBE/BROADCAST PRODUCTS

| Company Name | Product Name | URL | Price | Availability | Comments |
|---|---|---|---|---|---|
| BackWeb Technologies | BackWeb | backweb.com | Client software free | Now | Supports passwords at server |
| Diffusion | IntraExpress | diffusion.com | TBA | 1Q97 | Supports different clients |
| Intermind | Communicator; Global Publisher | intermind.com | Free; $195 | Available now | Communicator runs on Windows family, Mac and Unix |
| Marimba | Castanet | marimba.com | OEM licenses | Now | Java-based; updates software automatically |
| Netdelivery | Netdelivery | netdelivery.com | Free beta versions | Now | Internet-oriented now; intranet features in development |
| Netscape | Constellation (code name) | netscape.com | Not applicable | 1997 | Works with Communicator |
| PointCast | I-Server | pointcast.com | $995 | Now | Shipping 1Q97 is the related Pro-Server, which filters and distributes satellite feeds on an intranet |
| Trilogy | Selling Chain | trilogy.com | OEM licensing | 1Q97 | Internet-oriented |
| WavePhore | Newcast | wavephore.com | Subscription licenses vary | Now | Satellite newsfeed transmissions |

Division in Bellevue, Wash., is adopting Hyperconnector communications for its developer program, after more cumbersome stints with three-ring binders, easily outdated CD-ROMs and lengthy E-mails.

This way, developers can download only the data they require, says Stacia Johnson, developer program manager at AT&T Wireless. She posts new information on a restricted access Web site, and the appropriate developers get a Hyperconnector icon alert.

"It's so much easier to post one thing in one place electronically than to do bulletins and mailings and all that," Johnson says. "It really streamlines the process."



I-Server lets users mix information from a variety of sources.

Not all of her several hundred developers have signed up, but because it only takes a browser and Intermind's client, the system is easily accessible and Johnson believes the developers will participate.

Just as Intermind users can click on Hyperconnector icons to identify Web sites that apply push technology, users of Netdelivery Corp.'s products can subscribe to participating Web sites by clicking on a bar-code symbol.

The start-up offers free beta copies of its Netdelivery Member software, which accepts custom broadcasts from Netdelivery providers. Participating Web sites include Land's End, The Weather Channel and several magazines.

"Users can customize their subscriptions by the subjects on a page, or ask for updates on a time schedule," says Mark Johnson, a Netdelivery software developer. They also can choose the flag — an audio notice, icon or dialog box — and the contents.

Although Netdelivery has focused on Internet broadcasts, intranet-specific extensions are in development, according to the company.

Also straddling Internet and intranet is Trilogy, Inc., which expects to ship this quarter a Java-based entry. The company is among the first to use Marimba's Castanet technology facilitate broadcasts, implemented in its Selling Chain application.
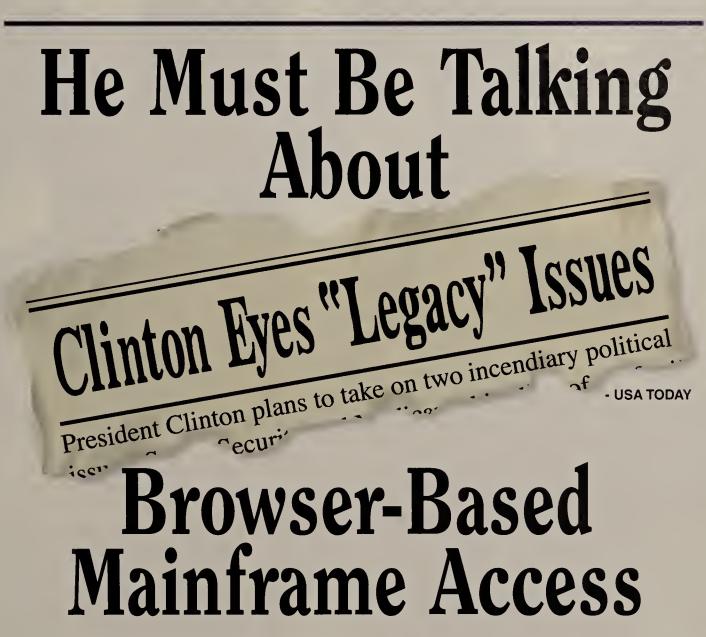
Selling Chain is a Web-based storefront for resellers, and is often implemented in a virtual private environment, says Allan Drummond, director of Trilogy's Internet business unit.

"Companies are trying to make their sales reps more efficient, and this lets them say: 'Tune into my channel,'" Drummond says. "Castanet provides automatic downloads to update client systems and information. We're very excited about Castanet as a way to distribute applications over a low-bandwidth network." Recipients can choose the format of the alerts, from dialog boxes to background updates that are invisible.

Whether it originates inside or outside the firewall, the publish/subscribe/broadcast scenario is becoming a fixture among intranet applications. Both Microsoft Corp. and Netscape Communications Corp. are planning to build some form of broadcast technology into their Internet products. Netscape recently announced Constellation, a server-based broadcast product; and Microsoft has said Windows updates will feature broadcast technology.

The information deluge that's soaking intranet users isn't likely to slow, but rain gear and umbrellas are coming to help them decide when and where they're going to get exposed to the elements. ⊜

# FRUIT

# *The intranet — UnderNet — ushers in a new cultural and information era at apparel maker Fruit of the Loom.*

# of MIS' Loom

BY BETH SCHULTZ

You'd think a company with an advertising campaign featuring leotard-clad men wearing big fruit costumes and pitching comfy underwear might encourage a little fun at work.

But, until recently, Fruit of the Loom, Inc. executives ran a strict, no-nonsense operation. The corporate culture, in fact, was on the stuffy side.

Employees — blue- and white-collar alike — put in 42 hours a week, mostly from 7 a.m. to 4:30 p.m. each day. They get their checks on Mondays, a decision dating to the '30s when executives worried that if employees got paid on Fridays they'd blow their earnings over the weekend at local taverns.

Culturally, it seems, the company has just stepped into the 1990s. Forget the fact that Fruit of the Loom has its thriving Activewear line — until last summer, male employees who worked at headquarters had to wear ties every day.

From a networking perspective, Fruit of the Loom was behind the times, too. MIS ran a small, basic Novell, Inc. NetWare LAN, primarily for file and print services. Different buildings at the headquarters complex in Bowling Green, Ky., weren't even networked, says Paul Hart, a software research analyst for the company.

Financial data was stored on a big Amdahl Corp. mainframe, and the company's production data — all 3.8 terabytes of it — was housed in a series of IBM Application System/400 databases at plants and distribution centers worldwide. Some of these facilities had dial-up connections or 64K bit/sec dedicated links to the headquarters, but not many.

Employees who needed access to either the financial or production data typically had a dumb terminal or perhaps a PC with an AS/400 connectivity package sitting on their desks, says Vern Germano, a senior systems analyst at Fruit of the Loom. "Users could get to the informa-

The MIS department has woven the fabric for Fruit of the Loom's intranet. Team members include (top, left to right): Brian Ochs, Glenn Banfield, Gretchen Gottlich, John Mayeur, Vern Germano, Jeff Hunt, Scott Curtis and Kim Cline; (bottom, left to right): Kelvin Arcelay, Matt Napier, Paul Hart, Tammy Kirby and Kurt Tinsley.

HOME PAGE  Fruit of the Loom

The Fruit of the Loom Web team settled on an AOL-like look for the corporate home page.

tion, but they had to jump a lot of hurdles," he adds.

IP, the cornerstone of an intranet, didn't really have a place in this type of environment. IBM's SNA and Novell's IPX protocols did the job of directing data between systems.

## Welcome to the '90s

The company has come a long way in the past year. Thanks in large part to the vision of new chief executive and information officers, MIS has broken out of its mold. "We've got a whole new philosophy: Give people access to the information," Hart says.

Jeff Hunt, a senior operations analyst who started working at Fruit of the Loom last March on a consultancy basis, says he was told upon his hiring: "We're operating in a 1960's mode, and we need to move to the year 2000 in a year and a half."

Even though the company did not have an existing TCP/IP-based infrastructure, it didn't take MIS much to figure out it should take advantage of Internet technology internally, says Glenn Banfield, director of electronic commerce systems development. In fact, the department already had acquired the tools — Netscape Communications Corp.'s Navigator browser and SuiteSpot servers — for an Internet project.

"Our CIO gave us a directive to integrate and enable access to the information systems we had in place," Banfield says. "We did not set out to create something new. We were guided by the principles of revenue generation, improved customer satisfaction, reduction in cycle time and cost reduction," he says.

What quickly evolved was a corporatewide Web named UnderNet.

UnderNet is still largely the domain of MIS, but the development team is fervently promoting its use throughout the corporation. "We'd like to see UnderNet better profile the enterprise," says Gretchen Gottlich, senior information technology analyst and Web team leader at Fruit of the Loom.

In other words, the Web team would like more departmental involvement in UnderNet. Some departments have presences on the intranet, but for the most part they are not deep. Oftentimes, they're simply there to say, "Here we are."

But the operations department is already putting the intranet to good use. Customer service representatives can use browsers to find out which Fruit of the Loom products are in stock. For example, agents can search for availability of red sweatshirts at stores

within a particular city.

Department representatives interested in UnderNet work with the Webmaster, Brian Ochs, to develop content. He has set up an intranet coordinator system, through which one person from each business group handles the content on that group's piece of the Web.

"Brian makes the availability happen, but you have to maintain it," Gottlich says.

By this March, when the Web team will host an intranet fair to push UnderNet, the goals are to have significantly more content online and to make sure that all home page icons burrow down at least four levels, Gottlich says. It wants to move beyond the "here we are" stage.

**Make way**

Gottlich has been instrumental in the development, rollout and promotion of the user-friendly, useful, but fun intranet, team members say. She also has been key in getting the resources – be they hardware, software or people – needed to get UnderNet up and running.

Gottlich started working at Fruit of the Loom on July 8. Within a week, she had procured a news server for the intranet.

By month's end, she had finagled a purchase order for a Pentium Pro server that would be used exclusively for the intranet. By Aug. 1, a directory server was running on the intranet, and the first newsgroup went up shortly thereafter.

"When I was hired, I interpreted the situation as: 'We've got a tremendous amount of intellectual strength and some hardware, now go make the magic happen,'" says Gottlich, who led the intranet development at the National Aeronautics and Space Administration.

What she didn't realize, Gottlich says, is that the cash wouldn't be readily forthcoming. While Fruit of the Loom is committed to opening its information to employees, it hasn't devoted any money to the intranet project. In fact, the only resource Gottlich's been able to get exclusively for UnderNet is the one Pentium Pro server. "We've basically begged, borrowed or stolen every server we have, except that one," Gottlich says.

MIS has about a $23 million budget,

but much of that money is going into infrastructure upgrades — new wiring, an Ethernet LAN and a frame relay network that links the 50 or so distribution centers and plants.

The lack of specific funding is more of an annoyance than a setback. The Web team has been able to piggyback the technology it has needed on existing deployments or get to it through requisitions for other projects. When the team needed another Web server, for example, it turned one of its many AS/400s into one.

The Web team got lucky with its mail servers. A year ago, E-mail primarily existed in the form of a mainframe package from Fischer International, Inc. called Totally Automated Office (TAO). Upper management dictated that MIS get rid of TAO within a year, Hart says.

With that edict, MIS had the go-ahead to begin using Simple Mail Transfer Protocol-based mail. Early users got Eurdora, but now Netscape Mail is the standard, along with Microsoft Corp.'s Windows 95 or 3.1 for Workgroups operating systems and NetManage, Inc.'s Swift IP stack, analyst Hart says.

Since it has started the corporate migration to intranet-based mail, MIS has had to update its mail server four times. As of mid-December, the company had about 900 SMTP mail addresses, says Tammy Kirby, E-mail administrator at Fruit of the Loom.

"E-mail has been one of the biggest factors in acceptance of the intranet," Hart says.

E-mail novices can turn to UnderNet for help in setting up and administering their accounts. The communication

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**WHY UnderNet**

10. Because Fruit of the Loom needs a daily "briefing."

9. We need an excuse to get bigger monitors.

8. Because data wants to be free.

7. It's the best way to get wired at work with or without Java.

6. Because computers share information better than Mmmm $\Sigma$ people.

5. It puts the "net" into networking.

4. People can't live by Ethernet alone.

3. So whenever we don't want to give out information, we just put up an "Under construction" sign.

2. Because it will give us enough work to give us job security for years.

1. Because everyone else has one!

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# SITE SEEING
A step-by-step guide to one of Fruit of the Loom's intranet sites

# Taking Stock

**A Fruit of the Loom production planner needs to figure out the best way to fill a large order for men's underwear the company has just received from an important retail customer. The manager has recently swapped out his 3270 dumb terminal for a desktop PC loaded with a Web browser and an IP stack, and has started venturing onto the intranet, called UnderNet. He remembers hearing that the Logistical Systems group has posted inventory information, so he heads to the UnderNet home page and clicks on the Online Reporting icon.**
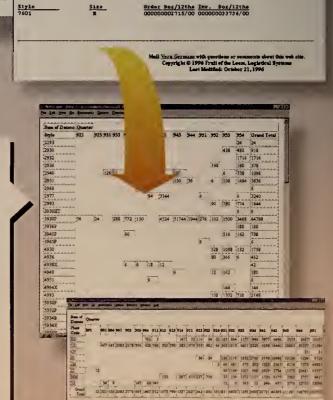
**①** The production planner wants to check the company's inventory of men's underwear against orders, so he hits the hyperlink that will take him to a display of current orders vs. inventory information by plant. In particular, he's looking for information on three- and seven-pack boxes.

**②** The planner knows there was some activity on men's underwear at the Jackson Distribution Center, so he chooses that as the first plant to study. He also keys in the appropriate style number and size. Within seconds, he learns that the plant still has many dozens of men's underwear in stock. Since it's most cost-effective to use the oldest stock first, the planner decides to check out a report on inventory age. He navigates back to the Online Reporting page and clicks on a link that takes him to a summary of inventory age.

**③** From the inventory age grid, the production planner discovers that Fruit of the Loom has an aging stock of seven-pack boxes of men's underwear, but the retailer wants three-pack boxes. In a win-win situation, the planner orders that some of the aging stock be converted from seven- to three-pack boxes and shipped to the customer as soon as possible.

A decision like this would have taken the production planner considerably longer if the information had not been available on UnderNet. He would have had to commission each report from the Logistical Systems group, which would have delivered them via hard copy days, if not weeks, later.

support group within MIS maintains a number of pages, including some on Netscape mail setup, that walk users through procedures.

Once they've got E-mail figured out, employees can use UnderNet to find each other. All they have to do is click on the Directory Services icon from the home page, and search by name or department.

## UNDERNET UNWRAPPED

On Nov. 12, 1995, Fruit of the Loom, Inc. employees at operational headquarters were greeted by an odd spectacle when they came to work: a bunch of MIS staffers dressed up in the company's infamous fruit costumes.

The big apples weren't trying to call attention to themselves per se, but to the intranet they were launching that day. They showed off the intranet, called UnderNet, on kiosks set up in the lobby. It was all part of the fun the group had in laying the groundwork for the corporate Web, and part of the effort to drum up support for UnderNet.

"I knew that technically we would have no problem getting the intranet up, but to be really successful we had to reach a critical mass," says Gretchen Gottlich, senior information technology analyst and Web team leader at Fruit of the Loom.

The event also provided a motivational force for people working on the intranet project, Gottlich says. "The significance of Nov. 12 is that it made us meet our deadlines," she explains.

That was no small feat, given that the Web team didn't hold its first official meeting until Sept. 9 and didn't really define its goals for the intranet until a month after that.

The UnderNet team is primarily made up of employees across the various MIS disciplines, but some other nontechnical folks got involved, too.

The UnderNet team has set March 23 as its next big target date. It plans on holding an intranet fair with about 10 booths running different services. "We'll be doing a soft sell, giving away T-shirts to people who go to every booth," Gottlich says.

She adds that she's not sure what's beyond that but knows she wants UnderNet to continue growing and to become more interactive. She'll undoubtedly concoct some affair to mark the end of that development phase, too.

The group has even developed directory pages for those employees with pagers. From those pages, users can type in and send a pager message.

By Gottlich's estimate, 1,500 people on the Bowling Green campus have access to UnderNet. The goal is to double that figure, to roughly 3,000, or about 10% of Fruit of the Loom's 30,000-employee population. The remaining 27,000 employees worldwide work in the plants, weaving and sewing the apparel.
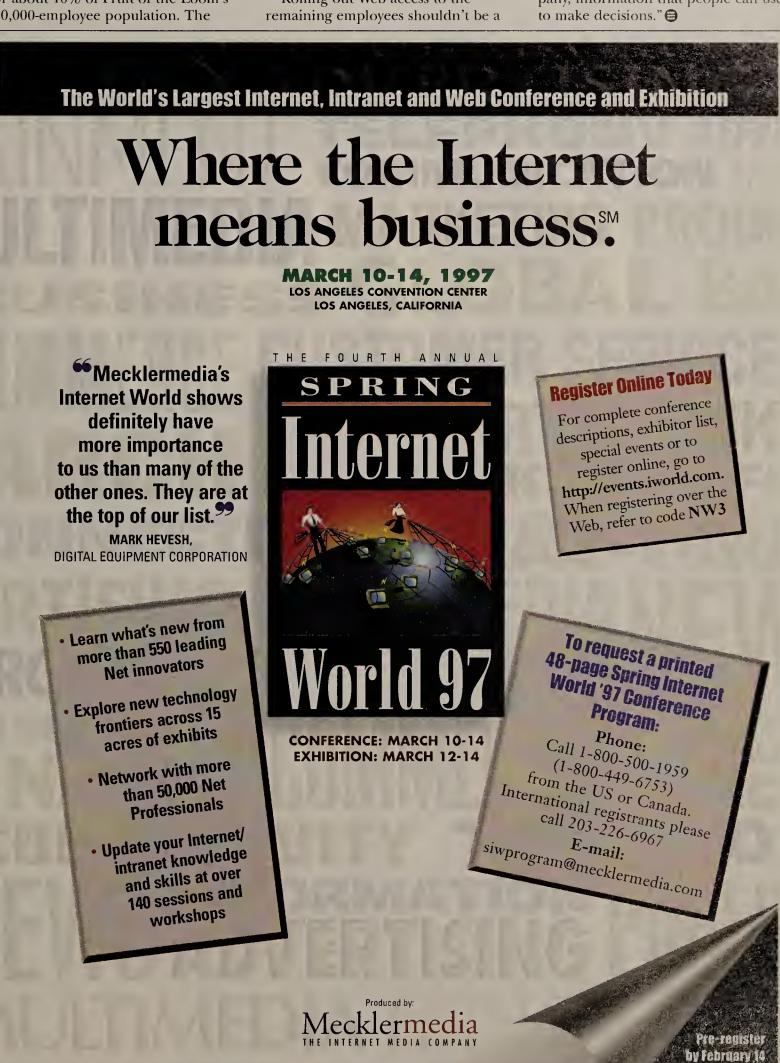
The team hasn't decided yet whether it will use kiosks to reach those people, but if it does, the numbers of employees with Web access will obviously increase dramatically.

Rolling out Web access to the remaining employees shouldn't be a problem. The hardest part, updating the infrastructure, is just about done. Now comes time to work on content.

"We've made this investment," analyst Germano says, "so now we have an opportunity as developers to put up information that will impact the company, information that people can use to make decisions." ⊜

# The newest in
# GROUP

BY MELLANIE HILLS

Groupware and intranets are two technology phenomena definitely meant for each other.

Corporate Webs provide the perfect backdrop for collaborative work, providing an easily accessible, ubiquitous platform for gathering and sharing information. The addition of groupware applications to the intranet is only natural.

With newsgroups and discussion databases — two groupware staples — team members outfitted with Web tools share ideas and techniques that result in faster product development. They can avoid pitfalls by reviewing previous project details stored in corporate knowledge repositories, another groupware basic. With desktop videoconferencing, also a groupware service, even those located in distant locations can easily participate in meetings and design reviews.

The point is, you can get many of the same results whether you're using proprietary groupware or intranet-based groupware tools, but the latter can be done more simply, for less. While Lotus Development Corp.'s Notes and other popular groupware products won't disappear, the arrival of intranet wares means network-based collaborative teamwork can become more commonplace.

It used to be easy to decide what groupware to use. With a price tag in the range of $1,000 to $2,000 per user, including training and support, either you could afford Notes or you couldn't. Or, for the Novell, Inc. fans, there was GroupWise — slightly less expensive, but not as well-known or highly advertised as Notes.

*Electrify your company's collaborative potential:*
*Give users Web browsers, add groupware software to*
*the intranet servers and watch your project teams go.*

# WARES



DAN BRYANT

At Texas Instruments, Domino will open Notes to 30,000 browser users, says Gene Phifer, senior IT manager at TI.

A wide range of other groupware and workflow products have come along, including Microsoft Corp.'s Exchange, a so-called "Notes killer."

Notes, GroupWise and Exchange, each developed before the advent of intranets, relied on traditional client/server architecture. When intranets started popping up, it was natural to think of how they could be used to reduce groupware expenses. And that's just what a new breed of vendors did, resulting in the creation of some inexpensive intranet-specific groupware products.

These products, from vendors such as Netscape Communications Corp., are compelling for managers who have wanted groupware but haven't been able to justify the high cost. With the intranet infrastructure already in place, they can simply add the application to the Web server so all browsers can access it. Some cases may require additional components or plug-ins for the browser, but these solutions are still less expensive, and easier to deploy and administer than traditional client/server groupware offerings.

Lotus quickly responded to this new product wave by dropping the price of its Notes desktop client from $155 to $69 and starting its push onto the Web. Other proprietary groupware vendors are rapidly Web-enabling their products, as well; Web browsers, in fact, may soon replace proprietary clients altogether.

So if you have an intranet, it's time to get going on groupware.

The hard part is helping your users choose the right product.

## The traditional players

With the rise of intranets, speculation was rampant that proprietary, client/server-based products would go the way of the dinosaur. When Netscape purchased Lotus competitor Collabra Software, Inc. in the fall of 1995 and announced its plans to bring groupware to the Web, the debate intensified to a fevered pitch. Netscape supporters and others declared Notes dead, but IBM had invested too much in Lotus to let that happen.

Lotus came back with a fury. The company introduced Domino, which combines a Web server with a Notes server. Domino lets users with browsers access Notes databases and do just about anything they can do with a Notes client.

The Domino strategy has impressed Ken Lownie, president of Connexus Consulting, an Andover, Mass.-based firm that specializes in groupware consulting. Connexus has done evaluations for a number of clients recently and has found that "all roads lead to Domino."

"Lotus is better [than new competitors] because it has been doing collaborative computing for almost 10 years, and with Domino, it's now available through a browser," he says.

## GROUPWARE AND YOUR INTRANET

*Groupware applications come in many shapes and sizes. All of the following can be used on your intranet to facilitate collaborative team efforts.*

### CALENDARING SCHEDULING TOOLS

Let users keep personal and group calendars. They're currently proprietary, but Netscape Communications Corp. plans to use the proposed Internet calendaring standards in its Calendar product.

### VOICE CONFERENCING

Allows phone conversations through tools such as Netscape's Conference, Microsoft Corp.'s NetMeeting, White Pine Software, Inc.'s CU-SeeMe and a host of Internet phone products.

### VIDEOCONFERENCING

Involves transmitting audio and video of participants and documents across intranets and the Internet. Bandwidth is a major issue for now, but will be less so over time. CU-SeeMe is the most established product in this class.

### ELECTRONIC MEETING SYSTEMS

Facilitate group brainstorming and let attendees contribute anonymously through computers hooked into a large screen at the front of the room. C.A. Facilitator for the Web from McCall, Szerdy & Associates is an example.

### WORKFLOW TOOLS

Perform structured activities based on rules that govern document flow. Lotus Development Corp.'s Notes has been a leader, but Open Text Corp.'s Livelink Intranet, WebFlow, Inc.'s SamePage and Radnet, Inc.'s WebShare also enable workflow.

### E-MAIL

Provides the underlying messaging infrastructure for other groupware. More and more E-mail products are incorporating the standard Internet E-mail protocols — Internet Message Access Protocol 4, Post Office Protocol 3 and Simple Mail Transfer Protocol — making it easy to exchange E-mail among disparate systems.

### CHAT TOOLS

Let users in multiple locations communicate simultaneously by typing messages from their keyboards. Chat tools record the dialogue for others, perhaps hundreds, to read later. The original chat tool, called Internet Relay Chat, is joined by Conference, NetMeeting and a variety of other products.

### CONFERENCING

Consists of various discussion tools that let users post questions and participate in online discussions. They may be discussion databases, such as those found in Notes, or newsgroups, forums and threaded discussions found in Netscape's Collabra, Microsoft's Internet Explorer Mail and News, Livelink Intranet and others.

### KNOWLEDGE REPOSITORIES

Let users publish, store and search for documents, memos, reports, presentations and files. This is a crowded part of the collaborative software market with numerous tools for intranet/Internet Web publishing and document management.

### WHITEBOARD TOOLS

Connects two or more computers so participants can share documents and mark up revisions; some products automatically capture those changes to the file. Some tools let you review and revise word processing documents, spreadsheets, presentations and other types of files. Products in this category include Conference and NetMeeting.

### GROUP WRITING/EDITING TOOLS

Let people working together create, review and revise reports and presentations. This is a class of tools emerging in products such as Microsoft's Office 97 and SamePage.

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Notes includes E-mail, discussion forums, databases and applications development. Last month, Lotus released Notes 4.5, which includes Domino plus new group scheduling and enhancements to applications development.

Connexus clients are thrilled with what Domino isn't, Lownie says. Domino gives them full-blown groupware without the proprietary front end. That saves hundreds of dollars, or more, on the cost of the client, the need to upgrade hardware to accommodate the client and the cost of training, which has been major with Notes.

"Domino is especially strong in tracking and workflow," Lownie says. "Netscape really isn't a player in workflow yet, and Microsoft has said you can build the tracking and workflow yourself with Visual Basic. By embracing Notes, the market has said it wants lower barriers to development."

However, companies still have a fair amount of administration to do with Domino, such as maintaining the

name and address book, Lownie says. Some clients are surprised by this, he adds.

For companies that want more than the basic offering, Lotus is aggressively pushing its ready-to-use Domino applications. These include Domino.Action, for building and managing a Domino-based Web site that includes instant collaboration features, and Domino.-Merchant, for creating a catalog and order-processing application that includes workflow.

In addition, Domino allows Lotus Components, such as spreadsheets, charts and project schedulers, to be embedded in Web pages and function as workflow tools. The newly released NotesPump 2.0 even lets you swap data between Domino and legacy databases, such as DB2.

Domino is a no-brainer for companies that have an installed base of Notes users and a large investment in knowledge databases, says Gene Phifer, senior IT manager at Texas Instruments, Inc. in Plano, Texas. For example, at TI,

which has 6,000 Notes users, Domino will open access to numerous Notes applications for 30,000 Netscape browser users.

Phifer says he is intrigued by the possibilities of Lotus Weblicator, a plug-in that turns any browser into a Notes replicator. It creates local copies of not only Web sites but also Notes databases. With Weblicator, users can even complete Notes- or Web-based forms offline and submit them when they reconnect to the server.

For those without Notes, the choice isn't so apparent. Managers will have to carefully consider how much functionality they'll need and use (most Notes users only use 20% of its functionality). Some functions may only be available for now in Web-enabled proprietary groupware, such as Notes. If you require less functionality, you may be satisfied with what's currently available in fully open intranet groupware.

Cost is certainly an issue to consider as the Web tools tend to cost less to deploy and require less training to use.

Microsoft offers a powerful messaging and workflow tool in its Exchange groupware product. Exchange Server 5.0, which will be available this quarter, uses Internet standards, lets browsers securely access Exchange mailboxes, calendars and collaborative discussion groups, and provides the ability to publish information from an Exchange server directly to a Web server.

Outlook, which ships in Exchange and Office 97, is the new Exchange Server client for those running Windows 95 and NT. It supports Internet E-mail and makes calendaring and scheduling available over the Internet or intranet. It also can call a browser for viewing and provide document access on an intranet when Exchange Server is used for the intranet knowledge repository.

Microsoft also is positioning its upcoming browser, Internet Explorer 4.0 Active Desktop, as the future universal client interface.

Novell's GroupWise, which requires a NetWare server, is almost neck and

neck with Notes in the groupware race — each has an installed base of between seven and eight million users. The latest version, GroupWise 5, includes E-mail, calendaring and scheduling, and full document management as part of the Universal In Box. It includes native TCP/IP support and is intranet-ready out of the box.

GroupWise WebAccess, an inexpensive add-on, lets users with any HTML 1.0-compliant Web browser access and log on to the GroupWise home page from across the Internet. They can then access the Universal In Box to send and receive E-mail, retrieve phone messages and look at calendars and to-do lists.

The Universal In Box and Web Access features are compelling for users at the National Board of Medical Examiners, says Stephen Lopez, director of systems and technology at the Philadelphia-based organization that prepares and administers medical examinations.

Users also find GroupWise more intuitive than Notes or Exchange, he adds. This quarter, Novell plans to release a Java-enabled WebAccess that will support any HTML 3.0-compliant browser and handle workflow and imaging. Later this year, the Group-Wise "Jefferson Project" will bring the ability to publish documents to the Web easily and dynamically and add support for full-text searching.

**The newcomers**
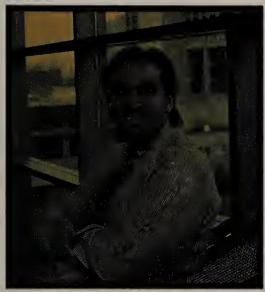
The Standard Edition of Netscape's Communicator product will be forthcoming sometime this quarter. It will include five components: the Netscape Navigator 4.0 browser; Messenger, an E-mail client that supports interactive Web content, filters messages, permits the exchange of digital business cards, and encrypts and digitally signs messages; Collabra, which supports discussion forums and newsgroups, provides search tools and supports offline messaging; Composer, a WYSIWYG HTML editing tool; and Conference, a real-time collaboration product that provides audioconferencing, shared whiteboards, chat and file transfer.

The Professional Edition of Communicator will be available in the second quarter of 1997. It will include: Calendar for group scheduling, which is based on the proposed vCalendar standard for letting users share calendars across intranets and the Internet; and AutoAdmin, a tool that allows IT administrators to lock down desktop configurations so only authorized personnel can change them.

A future Communicator component, Constellation, will gather information users want and alert them of it, making it available on the server so they can access it from anywhere. Communicator works with Netscape's SuiteSpot line of servers for internal Webs, directory services, E-mail, calendaring, discussion and news, indexing and

authentication.

AppFoundry, Netscape's entry into workflow, makes available free sample applications from vendors and consultants to convince the marketplace that, through a combination of Java, Java-Script, LiveConnect and LiveWire Pro



JOHN PERLMUTTER

**Users at the National Board of Medical Examiners find GroupWise more intuitive than Notes or Exchange, says Stephen Lopez, the organization's director of systems and technology.**

for accessing databases, you can easily build your own workflow tools. However, we might expect to see workflow eventually integrated into Netscape's product line.

For now, even with Microsoft giving away Internet Explorer, Netscape still has the majority of the browser mar-

ket, with an installed base of 45 million users. This gives it a significant edge in intranet groupware.

In addition to these large players, a variety of small start-ups have entered the intranet groupware field.

Open Text Corp.'s Livelink Intranet was one of the early entries into the intranet groupware market, for instance. It provides intranet-based document management, search, workflow and conferencing, and is a great tool for managing and tracking project workflows.

Conoco, Inc., a large oil and gas firm, chose Open Text's Livelink Intranet for its document management solution after reviewing several vendors', document management demonstrations, says John Lines, director of IT for the Mid-Continent Business Unit at the Ponca City, Okla., refinery. Users favored Livelink because of its ease of use and functionality. The product's good collaboration and superior workflow are icing on the cake, he adds.

Following a successful initial pilot with 150 users for automating the project management and workflow of the safety management process, Conoco plans on expanding Livelink's use to other parts of the company, Lines says.

Radnet, Inc., a start-up founded by three people from Lotus, offers Web-Share for building browser-accessible groupware applications. WebShare comes with customizable starter applications, including a calendar, problem-tracking form and threaded discussion databases, to get you up and running quickly. WebShare Designer lets you build more sophisticated custom groupware applications, though not as sophisticated as Notes or Exchange.

WebShare is a good product, but it is harder to develop applications in than in Notes, says Connexus' Lownie. It requires a slightly deeper skill set, he explains.

SamePage, from WebFlow, Inc., is a suite of intranet-based information and project management tools that includes group writing and shared editing, a type of conferencing, a knowledge repository, and some limited workflow. SamePage dynamically converts documents into HTML and allows reviewers to insert comments as objects that are then assembled into user-requested views. SamePage even allows you to assign and manage action items from inside documents using a subsystem called Take Action.

Many other good intranet groupware tools, especially niche products, also are available. So how do you decide what to buy? Your best bet is to focus on the needs of the users, as they really should own the project.

For starters, assess your busi-

ness and culture, identify business goals and how groupware can help meet them, and then determine whether your organization is ready for groupware. You may need to change some business processes to get groupware to work. For instance, you might rework the rewards system to encourage collaboration.

These preliminary steps are critical because many groupware projects fail not from technical issues, but because of people and organizational issues. Once you've taken them, pick pilot users and then you can set about actually choosing the groupware tools to use.

In the past, with proprietary offerings, departments have often gone off and installed groupware on their own, with no involvement from the IT department. But it's important that IT folks are involved in the selection and deployment of groupware, whether on the intranet or not.

Why? The goal of groupware is to let everyone communicate and work together. With departments choosing different platforms and products, IT often has great difficulty trying to make them all work together, and sometimes it's fruitless.

**Setting a course**

It's important that products meet both user and IT needs. By being involved from the beginning, and even taking a leadership role in helping the business choose its own groupware, IT folks can ensure that it all works together, and everyone benefits from that.

One of your technical concerns should be whether to choose a Web-ified proprietary product or one built from the ground up based on open Internet standards.

Open standards may be important if you want to use groupware with your business partners. As you review products, keep in mind the costs of software and installation pale when compared to the cost of taking users from their jobs for training.

As hard as it may seem to techies, the best way to have a successful groupware implementation is to focus on the people who will use the groupware. After all, it won't help the business if people don't use it. Make sure the products will meet their needs.

In addition, help users adopt and assimilate the technology. This will go a long way toward ensuring successful implementation and providing a competitive advantage for your company.

That's the whole point, after all. ⊜

*Hills is president of Knowledgies, a Plano, Texas, consulting firm that helps organizations plan, implement and promote intranets, groupware and an Internet presence. She led J.C. Penney Company, Inc.'s Internet/intranet team and is the author of* Intranet Business Strategies *and* Intranet As Groupware, *both published by John Wiley & Sons.*

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**INTRANET GROUPWARE CHECKLIST**

**1.** Identify and prioritize needs, both from user and IT infrastructure and operational perspectives.

**2.** Evaluate products based on the following questions:

➤ What platforms are supported?

➤ What platforms do you have?

➤ Which products are based on open standards and which are proprietary systems with open standards connections?

➤ What features does each product have? Do they meet your needs?

➤ What browsers are supported?

➤ Do you need an integrated product, or can you put together specialized products for specific user populations?

➤ How easily can your users get up and running with each product?

➤ How much training will users and developers need?

➤ How much will it cost?

➤ Will you need a lot of technical consultants to help you get started?

➤ Will you have to add resources such as servers, storage, bandwidth or people?

➤ How will you deploy these new applications and their upgrades?

➤ How stable are the product and vendor?

**3.** Decide which products to present to users, selecting only those with which the IT group can live.

**4.** Show products to the users, let them choose and decide on action steps for a pilot.

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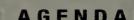
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## AGENDA

**8:45-11:50   MORNING SESSIONS**
- **Introduction**
- **Capturing the Top 10 IT Growth Opportunities**
  *Frank Gens, Senior Vice President, Research*
- **Will the Telcos Own the Internet? IT Opportunities and Impact**
  *Gigi Wang, Senior Vice President, Communications Industry Research*
- **Outlook for New Internet Technologies**
  *John Gantz, Senior Vice President, Personal Systems and Services Research*
- **Software Economics Beyond Microsoft: What Works?**
  *Tony Picardi, Group Vice President, Software Research*

| Session A 1:15 - 2:00 | Session B 2:15 - 3:00 | Session C 3:15 - 4:00 |
|---|---|---|
| **TRACK 1:   Internet Hot Spots** | | |
| Internet Technologies: Opportunities & Challenges Ted Julien | Java's Race to Overtake HTML Evan Quinn | New Media: Is It Ready for Prime Time? Bill Ablondi |
| **TRACK 2:   PCs for the Next Millennium** | | |
| Plugging in the Toaster: IDC's Outlook on the Information Appliance Marketplace Bruce Stephen | The Vibrant World of the PC Eric Lewis | Semiconductor Opportunities: System on a Chip Solutions Mario Morales |
| **TRACK 3:   Winning Software Strategies** | | |
| The Application-Centered Data Warehouse Emerges: What Partners and Channels Should You Pursue? Henry Morris | Internet Applications...Is Client/Server Dead? Clare Gillan, Michael Sullivan-Trainor | Bill's New Toy: Can Microsoft Cut It in Content? David Card |
| **TRACK 4:   NT in the Enterprise** | | |
| NT Adoption — How Fast Will It Happen? David P. Vellante | NT Servers and Clients: Building Winning Strategies Jay Bretzmann | NT: Unix Killer or New Market Growth? Dan Kusnetzky |
| **TRACK 5:   LAN/WAN Dynamics** | | |
| Next-Generation LANs: Treasure...and Target! Mark Leary | Extending the Enterprise: Remote Access, Wide Area Bandwidth, and More Lee W. Doyle | Network Management: Adding Value to the Package Rick Villars |
| **TRACK 6:   Market Spotlight** | | |
| The Battle for the Home: Global Prospects for New Media Products and Services Richard Zwetchkenbaum | The Year 2000: Tools and Services Industry Gold Rush and the Realities of End-User Projects Tom Oleson | Japan and Asia/Pacific Market Outlook Philippe de Marcillac |

**4:05-4:50   Keynote Address**
*Dr. Robert M. Metcalfe, Vice President of Technology, IDG*

**4:50   Coctail Reception**

## INTRAVIEW

## Q&A
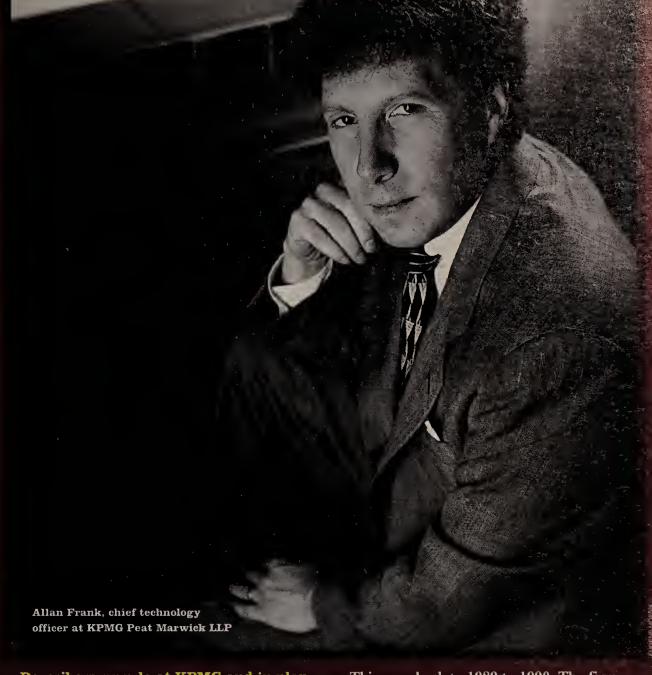
# Harvesting knowledge

*When Chief Technology Officer Allan Frank talks about the intranet he's building at KPMG Peat Marwick LLP, it seems as if he's speaking of another partner or team in the organization, except that this tireless corporate contributor is digital. Perhaps that's intentional: Frank's troops already are looking into virtual reality applications and experimenting with avatars to navigate the corporate metaverse. His conviction that collaborative knowledge is the heart of the company's operations echoes*

*throughout the present and planned intranet implementations. Frank recently related KPMG's efforts to convert its existing collaborative infrastructure to the Web to Senior Editor Peggy Watt.*

Allan Frank, chief technology officer at KPMG Peat Marwick LLP

**Describe your role at KPMG and in planning its intranet.**

We have a model unlike many other organizations'. We're a professional services firm. We're knowledge based, one big brain. I'm in charge of knowledge and the firm's IT capabilities; I oversee both our own internal systems and the outside consulting we do for our customers. We call this approach a living lab model because we ought to be what we eat. It's also a tremendous opportunity for us to serve our clients, by recognizing that the problems we have to solve as a business are the same questions our clients are asking us.

The typical CIO is disconnected from the business of generating new revenue, as in serving customers. In our world, I am part of the revenue side of the business, as well. Our CIO reports to me. ... We've pulled some of these pieces together so we can leverage in our own corporate use of technology what we've learned about the market, and also what we've learned internally that can be used for the benefit of our clients.

**What was the decision-making process that led to the intranet? And does the intranet drastically differ from your earlier system, requiring a big change in how people work?**

This goes back to 1989 to 1990. The firm took a strategic look at IT. That's when it started to grok with us that we are a quintessentially knowledge-based organization.

We realized our value and our strength was in shared knowledge, and what we had to do to distribute it to each and every person in the firm. Customers don't come to KPMG Peat Marwick just because we're nice people, but because of the value that everyone in the firm can add.

The concept of electronic bulletin board systems, conferencing and E-mail were all part of the architecture. Back in 1990, the architecture called for a knowledge map — knowledge is really the linkages between facts, not the facts, so a knowledge map was this tool to link. A Web page with URLs linking to distributed servers was exactly what we wanted in 1990.

So this was before Netscape [Communications Corp.'s Navigator browser], at the time of Mosaic. We chose SoftArc, Inc.'s FirstClass [groupware], and today we're its largest customer. We started around 1992 and '93 putting it in worldwide. We call it Knowledge Manager.

We view our organization as a matrix, and have determined that you need everything everywhere. Our model is not so much replication as being able to grab anything from anywhere.

In 1993 we deployed roughly 1,500 people on FirstClass, a good chunk of the consulting business. Now we have 17,000 people in the

# INTRAVIEW

**Q & A**

...U.S. on FirstClass, and another 5,000 have remote access from international offices.

Then Navigator shipped, and the more we heard of intranets the more we thought the concept was great.

**So you've begun Webizing Knowledge Manager?**

Right. KWeb is our intranet. It stands for Knowledge Web. SoftArc is developing browser access for FirstClass, so we'll take advantage of that. And we have licenses for Navigator. We'll have 100% of our people on KWeb in the next 12 to 24 months.

We're going office by office, LAN by LAN, getting IP to the desktop. We put in a terabyte warehouse that links to the Web and uses an Oracle [Corp. relational database] for up to 3,500 concurrent users. We also bought Oracle products for data retrieval and are deploying a lot of Netscape servers, basically as they become available.

**Who is driving the KWeb initiative?**

We are driving the internal Web initiative totally from the top. Our firm's senior leadership views the Web as a strategic building block to help create our future-state knowledge management environment. We aren't a widget manufacturer. We are the quintessential knowledge-based services organization. KWeb is the killer app for us as we move into the new millennium, fostering knowledge sharing and leveraging intellectual capital to create value for our clients.

The KWeb project is a multidisciplinary effort that involves directly all facets of our business, including information technology, human resources, marketing/ communications, finance and accounting, as well as all of our industry groups and functional audit, tax and consulting practices.

**At what point in KWeb's development did the IT/MIS folks become involved? How heavily is that department driving the project now?**

We have broken the problem into pieces: the KWeb technical development, the knowledge process and the underlying technology infrastructure and support functions. Our MIS department has been involved from day one in the technology infra-

structure and support functions. KWeb technical development has been primarily driven inside our Advanced Technology Lab in Radnor, Pa., and a team from our Enabling Technologies consulting unit. Remember, we are a large systems integrator and have a tremendously strong capability to serve clients in the intranet/ knowledge management space. Effectively, we ate our own medicine.

KWeb is a firmwide initiative. It is funded as a strategic investment by the Management Committee and approved by the board of directors.

This is a multiyear effort, by the way. We have increased our IT spending in the U.S. alone by more than 50% a year over what is expected to be a four-year period.

We aren't just dealing with Web pages here. We are fueling our net with a massive corporate data warehouse and knowledge repository, new WAN/LAN infrastructure, new Web-based applications, and



advanced operations and support capabilities. KWeb umbrellas all of these elements into a full enterprise, intranet-based environment.

**Do you have a good grip on the costs and the expected return on investment (ROI)?**

We think we have a pretty good grip on the costs for what we are doing. We spent almost a year planning this thing. We did not do an explicit ROI calculation on this one. For us, there is a direct correlation between knowledge sharing and return. To not have this capability is to not be in business in the year 2000. We looked at KWeb and an underlying institutionalization of knowledge management as the true force of competitive advantage for us. The ROI is almost infinite.

**How have people accepted the collaborative architecture and, now, the Web implementation?**

Most of this [adoption] is cultural. The question I get from people relates to the fact that the culture of the firm, if you go back, was the notion of the individual franchise. Knowledge sharing becomes an issue in that kind of environment. Do we have a knowledge-sharing culture? Confronting that issue made it easier for us, because as part of our strategy we reframed that. We dealt with the knowledge-shar-

ing aspects of the team. We brought in consultants. We dealt with the issue of being market focused, not just the matter of selling consulting work.

And we started to encourage entrepreneurs within the firm. The firm even started a seed pool of investments, for businesses and industry groups to create new products and services. People were becoming open to new ideas and ways of doing things.

So the intranet concept has been well-received. One of our most popular elements on FirstClass is real-time chatting. In real time, separated only by space, we find our chat room is like a gathering place.

For example, consider a senior leader in charge of one of the biggest organizations in the firm. This guy did not grow up in a technology-oriented world, but every month

he goes online and anyone can talk to him. He was blown away by the power of this system. With what other medium can you have a conversation with a thousand voices involved? The medium is fundamental for us.

And we're creating communities. Those chat rooms were organized by industry line of business initially. In the KWeb world, which is not yet fully deployed, the concept of community is much more granular. The doors are being thrown open, and anyone can come in. I'm a believer in planting the seed and letting it become organic. There might be 50 chat rooms. I don't care.

**What are your plans and aspirations for maturing and evolving KWeb?**

I'm a big believer in network computers [NC]. We're evaluating those, and I think we're going to do a lot with NCs.

Our skunk-works interest is in virtual reality knowledge management. I've got a bunch of guys screwing around with helmets and gloves and all that stuff. We have a KPMG metaverse hooked into the intranet. They're experimenting with avatars and alternative ways to link into the databases.
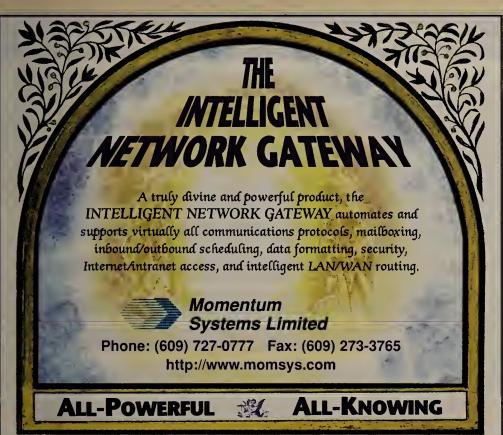
On the external side, to use our new technological experience in our consulting work, we've made massive investments in people. We have new products and services dedicated to knowledge-sharing services, network integration, knowledge management and managing nomadic workers.

We're providing Web-based solutions within our packaged solutions for our clients.

And remember, this is only year one of a four-year plan. ≡

# Suffering from Success (and Video)

*(Sing to the awful tune of "Where did all the flowers go?" by whomever it was. Ugh!)*

here did all my bandwidth go?
*Long time passing*
*Where did all our bandwidth go?*
*Long time ago*
*Where did all that bandwidth go?*
*Totally consumed, every bit*
*Where did all my bandwidth go?*
*Long time ago.*

In about one year, I bet the message of my rendition (not the actual song) of this dreadful old hippie ditty will be a common refrain in IT groups. And the culprit will be video.

Why? Allow me to explain.

In the beginning, your intranet will be a low-impact service. You'll have a Web server and a few test-pilot users. You and they will put perhaps 100 documents on the system, and the server might get, oh, 1,000 hits per day.

Growth will be slow but steady. The vast majority of network managers I've talked to who have solid experience with intranets confirm that growth is typically exponential. So over the first few months, you can expect the number of documents on your intranet to rise to several hundred and the number of hits per day to reach about 5,000.

Then someone decides that the call-tracking database should be fronted through the Web server. You'll be really happy about this, as it confirms that the intranet concept is having an impact. But your euphoria won't last. The number of hits per day could triple overnight and carry on, growing beyond your wildest nightmares.

But your problems won't be limited to an increasing number of server hits. A significant challenge will come from the back-end processing that provides the screens with which your users interact. And unless your network is extraordinarily designed, the intersegment traffic generated by the browsers will begin growing substantially.

Now you'll start to experience the next phase of bandwidth problems: Remote users will want to access the same resources as the employees at headquarters. As we know from the Internet, Web services scale well. However, the delays involved with routing across WAN links will make the remote users feel like second-class citizens.

To solve this problem, you can place staging servers at the remote sites and arrange to update content by some kind of batch replication. For example, you might use E-mail or maybe a commercial replication product such as Lotus Development Corp.'s Weblicator (really the replication technology stripped out of Notes and wrapped up with a $29 price tag).

You might even use the real information superhighway — Federal Express Corp. carrying CD-ROMs. (I admit it; I stole this line from industry luminary Bob Metcalfe — and just think of the bandwidth of a 747 full of CD-ROMs! But I digress.)

But even as you locate intranet servers at remote sites and add departmental servers to reduce intersegment traffic and processing, an even bigger problem looms on your horizon: video.

Just consider what you'll first serve up on your intranet: HTML documents, images and, perhaps, a few Java applets. Then you'll add some exotic things such as images created using the Virtual Reality Modeling Language (only if you're really cool) and allow retrieval of word processing templates and so on.

So far, all of these documents are in the range of 10K bytes to the low hundreds of kilobytes. No big deal.

To support computer-based training and, just to add a bit of pizzazz, you throw in a couple of video clips. Your users are impressed, so you take your creativity a bit further and add an Apple Computer, Inc. QuickTime VR virtual reality program so headquarters staffers can see what the remote offices look like (check the offices out at apple.com).

Then the CEO sees the clips and decides video would make a great way to distribute the weekly "Message to the Troops." Now you'll have this interesting situation: First thing Monday morning, everyone starts to download the corporate home page and, consequently, the CEO's deathless cinematographic exploits.

Bye-bye, bandwidth.

Then there's the other problem: Videoconferencing applications are getting cheap. Check out the VideoPhone conferencing system from Connectix Corp. (connectix.com). It gives you a reasonable picture and sound, and lots of bells and whistles for around $250 per desktop. And there's even a color version.

Staffers will buy these things out of discretionary budgets, and they will argue a hundred ways to Sunday that they have a valid reason for using the videoconferencing system. You won't be able to stop them.

So, just remember that all intranet trends grow, in general, exponentially. This rule will apply to every aspect of intranet content. If you're not careful, your intranet document collection will run flat-out toward one million before you know what has hit you.

Just imagine managing one million documents — that's what will become one of the great obsessions of the new millennium.

But the first problem you'll have to tackle will be bandwidth. However, unlike my song, it will be a short time passing. And video will be the culprit.

*How many documents do you have, and what are you going to do with them on your intranet? Let me know by sending E-mail to mgibbs@gibbs.com or by calling (800) 622-1108, Ext. 504.*

JOEL NAKAMURA

# Got Frame Relay Management on Your Mind?

*I need proactive tools that maximize network availability.*

*How do I know how much bandwidth I need?*

*How do I know I'm getting what I paid for from my carrier?*

*I want to leverage my enterprise management platform.*

*How can I manage without Sync Circuit Management?*

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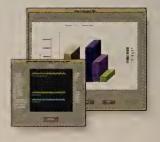
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# Keeping the Huns at bay

*These eight firewalls can save your network from malicious invaders.*

**By Joel Snyder**

Every firewall has a built-in security philosophy, so to find the right product for your organization, you must first decide on your own security policy and philosophy. Only then will you be able to nail down the most appropriate product.

Out of the eight firewalls we tested — each of which had to run on multiple platforms and allow application-level proxies — we found four favorites that fill different niches and solve different problems.

For small organizations that want to protect themselves from assailants, yet allow internal users freedom to roam the Internet, AltaVista Internet Software, Inc.'s AltaVista Firewall proved to be a suitable, cost-effective solution. On Windows NT, it offers an easy-to-use management console that took us less time than any other product to install and configure.

But AltaVista Firewall is too inflexible for large networks. For example, it treats everyone inside the firewall identically, regardless of who they are. A larger organization probably would feel more comfortable with Raptor Systems, Inc.'s Eagle, which has greater flexibility in defining services, users and groups that can pass through the firewall.

Businesses that want to make multiple systems inside the firewall available to outside users should consider Milkyway Networks Corp.'s Black Hole. It offers a wider menu of choices than Eagle to the security manager who wants to let some traffic through the firewall, albeit in a controlled way.

Some prefer packet filtering for performance or flexibility reasons. The most impressive product in this area, and our overall winner, is Check Point Software Technologies, Ltd.'s Firewall-1, which also boasts the best multifirewall management.

## Picking a platform

We only tested products that run on multiple plat-

forms because we believe users should be able to choose which platform fits best in their environments. We looked at Microsoft Corp. Windows NT versions whenever possible. Our experience with the NT versions contrasted sharply with what we found with the Unix-based firewalls. Early firewall vendors included hardware with their software, and we learned why: Setting up the Unix platform to run these products on generic Intel Corp. hardware was a major chore. In contrast, installing them on NT was trivial.

As firewalls move from specially constructed fortresses built by Unix and security gurus to more of a commodity item, Windows NT will become the platform of choice. Most of the products we tested offer the NT option. They include AltaVista Firewall, Trusted Information Systems, Inc.'s (TIS) Gauntlet, Network-1 Software and Technology, Inc.'s Firewall/Plus, Check Point's Firewall-1, Global Internet's Centri and Raptor's Eagle.

On the other hand, Windows NT had its own problems. For NT-based firewalls that depend on the Microsoft-provided TCP/IP stack (all but Network-1's Firewall/Plus), we discovered that simply bringing up another system with the same IP address as the firewall (an accidental operation that could easily happen) can lock up Windows NT — and the firewall.

Livermore Software Laboratories International, Inc.'s (LSLI) PORTUS firewall, which we tested on Sun Microsystems, Inc.'s Solaris, was the only Unix-based entry we were able to bring up in our test labs. Even then, we had to do considerable hardware fiddling to find a configuration acceptable to Solaris.

The other Unix-based vendors' products, Secure Computing Corp.'s Borderware, Milkyway's Black Hole and TIS' Gauntlet, all run on Berkeley Software Design, Inc.'s BSDI Internet Server. This Unix operating system was so picky, we were simply unable to get it running on any of our three test systems.

After BSDI support was unable to make the operating system work on our hardware, all three vendors shipped us preconfigured hardware. Unfortunately,

STU SUCHIT

## Buyer's Guide upgrade

Beginning this week, we're giving our Buyer's Guides a new twist by adding a testing element. We'll be bringing the leading products covered in each Buyer's Guide into our labs for a close, head-to-head inspection. Then we'll report the results in these pages. Senior editorial staff, with input from experts in the field — including you, our readers — will determine which products we put under the microscope.

This is in addition to the familiar Buyer's Guide chart (starting on page 50) that lists all the salient information you need on every known product in a given category. Along with the chart, we'll provide a succinct analysis of market trends.

All this is with one goal in mind: to give you the best information we can to help you make an informed buying decision. Let us know what you think, and, as always, we welcome your ideas for further improvement.

*Paul Desmond*
*Features editor*
*pdesmond@nww.com*

Figure 1: *Raptor's Eagle configuration GUI matches sources and destinations with specific reporting and permission rules, at the same time.*

Secure Computing's system wouldn't boot Unix off the floppy, so we were unable to evaluate the Borderware product in time to meet our deadline.

### Security philosophy and capabilities

We ran Internet Security Systems, Inc.'s (ISS) Firewall Scanner and failed to find security weaknesses in any of these firewalls. This isn't surprising because all are certified by the National Computer Security Association. Still, it bears noting that just because we didn't find any holes it doesn't mean there aren't any.

The traditional firewall taxonomy begins with packet filters, which are built into most routers, and works its way up to application-level proxies that under-

stand and filter at the highest level. (For a discussion of what some of these products use, see story, page 44.)

To help sort out the different firewalls, consider how traffic moves through them. In general, firewalls divide the world into two camps: trusted and untrusted. The manner and ease with which connections are allowed to go from the trusted side to the untrusted often differs greatly from the reverse path.

Firewall/Plus has the most black-and-white view of what is trusted and what is not. A Firewall/Plus system has exactly two LAN interfaces. The icon for one is a devil; the other, an angel. AltaVista Firewall also has a strong inside/outside orientation, supporting only two LAN connections. All the other products can handle at least three LAN interfaces.

While two interfaces often is enough for an Internet-oriented firewall, many organizations need three: one for the Internet; one for "public" servers for such items as HTTP, Network News Transfer Protocol and File Transfer Protocol (FTP) and one for the inside. When firewalls are used internally, more than three LAN connections may be required to implement the corporate security policy.

The most transparent path from the inside to the outside world is provided by packet filtering firewalls such as Check Point's Firewall-1. Packet filters allow unadulterated TCP/IP connections to go from the inside of the firewall to the outside, subject only to the security policy and rules set in the firewall. A key feature of these firewalls is that they do not change IP addresses passing

through. This means any application layer protocol that has knowledge of IP addresses will work through these firewalls without changes or special programming.

Firewalls that support application- or transport-level proxies are not as transparent. They perform some sort of Network Address Translation (NAT) on packets moving through the firewall.

Generally, the address of the system inside the firewall is replaced with the address of the firewall itself. The problem with this approach is that some application protocols have an intimate knowledge of IP addresses and will only work with special processing. The most common of these is FTP. Because FTP is so popular, all firewalls that perform NAT also have an FTP-specific application layer proxy.

Milkyway's Black Hole supports both modes of operation: It normally acts as an NAT but can behave like a proxy server without changing addresses (what Milkyway calls a white hole) if the application requires

### HOW WE DID IT

To evaluate these firewalls, we looked at each product's platforms, general capabilities, management interface, flexibility, and reporting and alerting features. Because of the strong market interest in Windows NT, we evaluated Windows NT versions whenever possible. The test platform was a Pentium-based 133-MHz system with 32M bytes of memory. For some products, we accepted a hardware/software bundle from the vendor.

## ScoreCard

| | Weight | AltaVista | Firewall-1 | Centri | PORTUS | Black Hole | Firewall/Plus | Eagle | Gauntlet |
|---|---|---|---|---|---|---|---|---|---|
| **Overall score** | | 6.8 | 7.4 | 6.2 | 5.7 | 7 | 5.3 | 7.2 | 7.2 |
| **Platforms supported** | 10% | 9 | 8 | 7 | 6 | 5 | 8 | 8 | 8 |
| **General capabilities** | 15% | 6 | 8 | 7 | 7 | 8 | 5 | 7 | 9 |
| **Management** | 25% | 8 | 9 | 6 | 5 | 8 | 3 | 8 | 5 |
| **Flexibility** | 25% | 4 | 8 | 7 | 6 | 7 | 10 | 7 | 9 |
| **Reporting and alerting** | 20% | 8 | 4 | 4 | 5 | 6 | 2 | 6 | 6 |
| **Documentation and online help** | 5% | 8 | 6 | 7 | 5 | 7 | 2 | 7 | 7 |

Scores based on a scale of 1-10. Categories are weighed by the percentages shown.

| AltaVista Internet Software | Check Point Software Technologies | Global Internet | Livingston Software Laboratories International | Milkyway Networks | Network-1 Software and Technology | Raptor Systems | Trusted Information Systems |
|---|---|---|---|---|---|---|---|
| **ALTAVISTA FIREWALL** | **FIREWALL-1** | **CENTRI** | **PORTUS** | **BLACK HOLE** | **FIREWALL/PLUS** | **EAGLE** | **GAUNTLET** |
| **Pros** | | | | | | | |
| ▲ Very easy to configure with GUI<br>▲ Alerting and real-time attack avoidance<br>▲ Broadest platform support<br>▲ High performance<br>▲ Good logging and reporting tools | ▲ Multifirewall configuration/management easy<br>▲ Flexible and stateful packet filtering, including UDP<br>▲ Object-oriented GUI<br>▲ High performance in packet filtering | ▲ Both proxy and packet filter<br>▲ HTTP content and URL filtering<br>▲ Integrated GUI<br>▲ Transparent IP outgoing | ▲ Remote administration<br>▲ Dual Domain Naming System<br>▲ Log tools<br>▲ High performance<br>▲ Multiple strong authentication choices | ▲ Very flexible access to interior and exterior services<br>▲ Good log and reporting tools<br>▲ Easy-to-use GUI | ▲ Largest number of protocols, including non-IP<br>▲ Can be invisible to outside world<br>▲ Stateful packet filtering | ▲ Easy-to-use GUI<br>▲ Transparent IP outgoing<br>▲ Alert during break-in attempt<br>▲ Internal integrity checker | ▲ Widest range of application proxies<br>▲ Good proxy and packet filter capabilities<br>▲ Good reporting summary tools<br>▲ Internal integrity checker |
| **Cons** | | | | | | | |
| ▼ Configuration possibilities strictly limited<br>▼ Authentication types very limited | ▼ Poor proxy performance and functionality<br>▼ Poor reporting tools | ▼ Poor reporting strategy<br>▼ Simple-minded packet filters<br>▼ GUI crashes, NT crashes | ▼ Difficult configuration<br>▼ Inflexible policy<br>▼ Solaris port not thoroughly tested | ▼ Poor BSDI support | ▼ Exceedingly difficult to configure<br>▼ Reporting tools buggy and deficient, can't write to local hard disk<br>▼ High loads halt GUI operation | ▼ Incoming access inflexible<br>▼ Bugs in proxies<br>▼ Poor reporting tools | ▼ Simple-minded packet filter<br>▼ Difficult configuration and management with incomplete GUI<br>▼ Poor BSDI support |

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# Novell® Colin Ungaro and John

leaders in networking);

www.novell.com

Gallant, (CEO, and Chief Editor of Network World),
the National White Collar Crime Unit,
and a list of others.

Figure 2: *Check Point's Firewall-1 GUI policy editor lays out permitted and prohibited events using a simple, rule based approach.*

it. Check Point's Firewall-1, Global Internet's Centri and TIS' Gauntlet can do both to some extent.

Of course, if you use private addresses and you want to connect to the Internet, having a complete NAT may not be just a good thing, it may be a requirement.

Not all proxies behave the same way. Application- and transport-level proxy services can be more or less intrusive to the client.

In the nonintrusive case, the client system attempts to connect through the firewall to an IP address on the outside. The firewall intercepts the connection and forms a second connection on behalf of the client, bringing the two together with a proxy. The nonintrusive proxy firewalls include Global's Centri, Raptor's Eagle and Milkyway's Black Hole. Don't use the term "transparent" to describe this configuration — each firewall vendor has a different definition of that term, and one vendor's transparent connection is another vendor's opaque connection.

For intrusive connections, the client must make an explicit connection to the firewall. The client then has to tell the firewall where to make the final connection. Intrusive proxies include LSLI's PORTUS, AltaVista Firewall and TIS' Gauntlet.

Although an intrusive connection may sound like a bad thing, many casual Internet users will not even know what is happening. The popular Web browsers, including Netscape Communications Corp.'s Navigator and Microsoft's Internet Explorer, have built-in support for working with intrusive proxies. With a few clicks, you can configure the browser to work with the firewall proxy. Proxies are only a problem when you are trying to use uncommon protocols through the firewall.

Even nonintrusive proxies do not guarantee success. For example, when testing Raptor's Eagle, we found that its proxy does not properly synchronize both ends of the connection, which can cause data loss and other communications failures.

In general, we observed that none of the firewall proxies properly handled TCP option negotiation. For plain-vanilla applications such as Internet Web browsing, this is not a big deal. But when firewalls are deployed within a company where more esoteric protocols are used, this could lead to performance problems.

**Management interface and GUI**

Firewalls have come a long way from the first Unix-based conglomerations. Sophisticated security policies can now be created with relative ease — on some systems. A good configuration interface is an important part of a firewall since few organizations set a security policy

that never changes.

Having a pretty graphical user interface (GUI) is no guarantee of configuration ease, though. For example, Network-1's Firewall/Plus has a GUI that handles all configuration issues yet is completely unusable. There is no simple way to say, "Let this range of ports through in both directions." Global Internet's Centri also looked nice, but the user interface crashed on us several times. Fortunately, this did not in any way affect security, just the ability to change configurations.

The firewalls we were most comfortable configuring were LSLI's PORTUS, Raptor's Eagle, Milkyway's Black Hole and AltaVista Firewall. With all of these, even a clumsy user would have a hard time making an error that would allow unintended access.

Raptor's Eagle and Milkyway's Black Hole both do a good job of simplifying the firewall environment so you can easily implement the security policy without worrying about making an error that will allow insecure access (see Figure 1, page 42).

Check Point's Firewall-1 also has a well-designed GUI, but the oversimplification of certain concepts implemented as check boxes in Firewall-1 can have enormous repercussions. This is actually more of a documentation than a GUI issue, as Firewall-1's online documentation is exceptionally poor.

However, Firewall-1 has something no other firewall we tested offers: the ability to configure a group of firewalls as a single entity (see Figure 2). Using the GUI, you can build rules that are installed on multiple firewalls and packet filtering routers within your enterprise. (Cisco Systems, Inc. and Bay Networks, Inc. routers are supported.) That makes it easy to



Figure 3: *AltaVista Firewall lets you easily identify events that change the alert level of the firewall, send messages to the security manager or even disable the firewall.*

# Proxy potpourri

**A**ll the firewalls we tested have a mix of packet filtering and proxy technologies. It's impossible to pigeonhole any one product. For example, Livermore Software Laboratories International, Inc.'s (LSLI) PORTUS is primarily an application-level proxy but also includes a transport-level proxy (usually called a plug gateway), a Simple Mail Transfer Protocol relay and support for SOCKS, a transport-level proxy that requires customized clients. Global Internet's Centri, Trusted Information Systems, Inc.'s (TIS) Gauntlet and Check Point Software Technologies, Ltd.'s Firewall-1 mix application- and transport-level proxies and relays with additional packet filter capabilities. Raptor Systems, Inc.'s Eagle, AltaVista Internet Software, Inc.'s AltaVista Firewall and Milkyway Networks Corp.'s Black Hole all include only transport- and application-level proxies and relays, while Network-1's Firewall/Plus ranges across the board, concentrating on frame-level filtering but with limited application proxy ability.

Firewall products bear the unmistakable stamp of their designers. When it comes to making your network secure, the firewall lets you do only what the designer allows. For example, if you want to authenticate user access through the firewall, AltaVista Firewall requires that you use one time passwords (normally with a handheld token). If your corporate security policy allows for reusable passwords, forget AltaVista Firewall.

We had a similar experience with LSLI's PORTUS. For testing purposes, we wanted to use reusable passwords. Not an option. The designer knows what's secure and won't let you do the wrong thing.

Other restrictions are more subtle. For example, Raptor's Eagle allows many-to-one connections from the outside, but not many-to-many connections. That means if you want to have a news server inside the firewall, you can have only one. For many organizations, even one server is too many. But these highlight the importance of determining your needs before you select a firewall.

Many of the firewalls have features that may be of use in special situations. For example, TIS' Gauntlet has an application-level proxy for lp, a client/server printing protocol. Although other firewalls can pass lp using a TCP-level proxy, TIS is the only product that does a true application-level proxy. Of course, not many people would want to print through their firewall. But if you need that, TIS is the place to get it.

In the same vein, Check Point's Firewall-1 supports remote procedure call, which allows you to mount Network File System volumes across a firewall; LSLI's PORTUS supports a special out-of-band authentication protocol; Milkyway's Black Hole and TIS' Gauntlet support X Window System; and Network-1's Firewall/Plus supports non-IP protocols such as AppleTalk, IPX and DECnet. If you have an unusual requirement, you may find that only a single product meets your needs. ■

*— Joel Snyder*

keep cooperating security domains consistent, which, in turn, makes Firewall-1 an excellent choice if you need multiple internal firewalls.

AltaVista Firewall also has a nicely designed user interface that complements the product's relative simplicity. AltaVista Firewall is the easiest to configure and control of all the firewalls we looked at.

Mired in the world of editing text files are LSLI's PORTUS and TIS' Gauntlet. To build or change configurations on these requires a text editor. Plus, you have to know which of the many configuration files must be changed.

PORTUS, which is a relatively simple firewall, does not suffer too much from its min-

## STATE OF THE STATE

All the packet filtering products we

tested maintain some state information

about packets that pass through them.

imalist management interface. Gauntlet, however, has no excuse. As one of the oldest and most richly featured of the firewalls, it resembles a Unix-based erector set more than an integrated firewall.

TIS provides a screen-based GUI that manages some files, but even a simple customization requires groveling through additional configuration files using complex syntax and semantics. Some network managers will enjoy having the internals so exposed for poking and prodding, but when contrasted with Black Hole or Eagle, Gauntlet has a long way to go.

We reserve a special place in our hearts for the Firewall/Plus GUI. Network-1 has chosen an approach that more closely resembles a network protocol analyzer than a firewall. The software reaches into each frame, pokes around and decides whether to pass it. The nice part of this approach is that Firewall/Plus can handle non-IP protocols such as IPX, AppleTalk or DECnet.

Unfortunately, Network-1 hides none of this complexity from the network manager. Making simple changes to the Firewall/Plus configuration is beyond the ken of any but the most determined and educated security managers. By contrast, Check Point's Firewall-1 has similar complexity, but it is internal and well hidden, so the security manager needs to uncover it only when necessary.

While Firewall/Plus starts with a Configuration Wizard that sets up a basic configuration predicated on an undocumented set of generic policies such as "liberal outgoing," making changes to an existing policy is asking for trouble. It took us longer to modify a running Firewall/ Plus for our tests than any other product.

### Flexibility and features

With a firewall, the term "flexibility" can imply insecurity. Some firewalls, such as AltaVista Firewall and PORTUS, don't give you a lot of flexibility. On the other hand, this makes it almost impossible to screw up and build an insecure configuration.

Firewalls are as susceptible to feature creep as any Microsoft product. For example, Check Point's Firewall-1 started out as a sophisticated packet filter. Today, it is a packet filter, part-time application proxy, NAT and encrypted virtual private network (VPN) gateway.

The king of features is certainly TIS' Gauntlet. As the oldest continually enhanced product, it includes more application-level proxies than any other product. It also has a range of authentication options, including four kinds of onetime passwords.

You can add encrypted VPN support, packet filtering, an integrity checker and content filtering of HTTP queries to get a complex but flexible, full-featured system. Gauntlet has solid competition in Raptor's Eagle. Eagle has many of the features Gauntlet provides, but with fewer proxies, no packet filtering and no VPN in the Windows NT version we tested. (VPN is

available in the Unix version.) Eagle provides a much better management and configuration interface, along with built-in real-time reporting of intrusion attempts.

Eagle, however, suffers from a lack of maturity in some of its proxies. For example, its SMTP relay does not support any well-accepted Internet request for comment extensions, including PIPELINING, SIZE or 8BIT, and its FTP proxy was unacceptably intolerant of our test client.

Other products vary in how effectively they handle SMTP relays, VPN and other features.

None of the SMTP relays in the firewalls were especially intelligent or useful. Handling E-mail in firewalls by running it through sendmail — which is what all SMTP relays we tested did, except for AltaVista Firewall — is a little like giving eggs to a small child. Our advice is to use a secure mail server in the first place and to pipe your mail through the firewall via proxy rather than relay.

VPNs (sometimes called encrypted tunnels) are also on the hot list. Using VPNs, you can build a secure communications path internally or across a public network such as the Internet. VPN support is built into Check Point's Firewall-1, the Unix version of Raptor's Eagle, Milkyway's Black Hole and TIS' Gauntlet. AltaVista offers VPN support using a separate layered product, AltaVista Tunnel.

VPNs are most often used between two firewalls for encrypted communications. However, the new feature people are clamoring for is personal tunneling, which gives a single user on an insecure network, such as the Internet, the ability to connect securely through the firewall. Only AltaVista and Raptor offer personal tunneling at this time.

Firewalls also differentiate themselves in breadth of authentication capabilities.

Popular choices for authentication include the free S/Key system, Security Dynamics Technologies, Inc.'s time-based SecurID and Data Encryption Standard-based systems from Digital Pathways, Inc. or CryptoCard Corp. The widest choices come in TIS' Gauntlet, LSLI's PORTUS and Milkyway's Black Hole, which support all three of these.

Certain newer features are just making it into firewall product lines. For example, HTTP URL and content-based filtering is a hot topic in the security community, but firewalls are just beginning to include this

## Consider Cyberguard

**A**fter our evaluation was completed, we learned that another firewall vendor, Cyberguard Corp. (www.cyberguardcorp.com), had a product that met our evaluation criteria. We plan to review a Cyberguard firewall in a future issue.

capability. Currently, content-based filters can be used to keep Java and ActiveX programs from entering the local network. Global Internet's Centri, TIS' Gauntlet and Check Point's Firewall-1 were the first to add this feature.

### Reporting and accounting

The most neglected area in the firewalls we tested is alerting and reporting. We contend that any firewall that cannot send out an alert when it detects an attack is deficient. Raptor's Eagle and AltaVista Firewall have the most sophisticated features in this area.

Eagle offers a series of alerting capabilities based on frequency. For example, it is simple to define: "If someone tries to telnet in more than 100 times in 5 minutes, we've got a problem." Once an alert is triggered, Eagle can play a sound, send mail or otherwise notify you.

AltaVista Firewall has a different strate-

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# 2nd Annual

## 1997 Intranet Excellence Awards

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**Award Categories**

- Intranet Web Server Software
- Intranet Web Server Hardware
- Intranet Web Browsers
- Authoring Tools
- Search & Retrieval Technologies
- Security Products
- Electronic Commerce Tools
- Collaboration Tools
- Legacy Integration Tools
- Internet Service Providers (ISPs)
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## Buyer's Guide
*Continued from page 46*

gy. It has a series of states: green, yellow, orange and red (see Figure 3, page 44). At each level, you can define events that move the firewall up to the next level and take some action. For example, you may decide that if the firewall detects too many telnet failures, it should move to yellow alert, disable the telnet proxy for two hours and send mail. You can even have AltaVista Firewall shut down the firewall if warranted; for example, if you are running out of disk space. After a period of time, the firewall lowers its alert status.

AltaVista Firewall shows its current state graphically by changing the background color of the console to match the state. We enjoyed watching our test AltaVista Firewall move to orange alert as we probed it with ISS' Firewall Scanner.

The Unix-based firewall vendors, including LSLI, TIS and Milkyway, dismiss this issue by suggesting that the network manager could write some tool to analyze the logs and create alerts based on that.

Similarly, most products do a poor job of handling the task of summarizing and distributing reports. Global's Centri, for example, sends by E-mail long, verbose, hard-to-read summaries at regular intervals. Any network manager subjected to the barrage of output from Centri would soon ignore the reports and miss any problems reported.

The reporting software Raptor bundles with Eagle is substandard, but the company sells an add-on package to help analyze traffic.

Exceptions to the poor reporting rule are TIS' Gauntlet, AltaVista Firewall and Milkyway's Black Hole. Both Gauntlet and AltaVista Firewall have nice reporting strategies that can automatically generate and send reports at selected intervals. Milkyway has gone overboard in reporting capabilities: Its Black Hole stores logging information in a relational database (Postgres) and lets you use either prewritten scripts or SQL queries to generate reports.

### Nailing it down

In closing, we must emphasize again that firewalls are not general-purpose products. Each is designed with a security style in mind. Configurations that are simple in one product are impossible in another. You cannot choose the right firewall until you decide how you are going to install it, configure it, maintain it and manage it. Considering the points we tested should help you nail down your security lid. ■

# There's a firewall for every net

**By Kathy Scott**

Responding to the pace of Internet and intranet activity, firewall vendors are furiously churning out robust Unix-based packages, Windows NT-based offerings and shrink-wrapped units that are easy to install and configure. At the same time, companies are coming out with enhanced support for Internet-based virtual private networks (VPN) and better firewall management tools.

The broad spectrum of firewalls available should make it easy to find one that fits tightly with your security policy, whether it calls for an application gateway, application-level proxy server or advanced packet-level filtering service.

By checking application layer information against a set of established security rules, application-level firewalls decide whether a user should be granted access to a particular application. If access is approved, the firewall does some form of packet address translation and brokers the passage of packets between your network and the Internet, thus hiding your internal network addresses from the 'Net.

Firewall vendors clearly are sold on this level of security. Most of the products listed in the chart starting on page 50 work at this level. They provide access protection for applications such as telnet, File Transfer Protocol, Network File System, Simple Mail Transfer Protocol and Wide-Area Information Servers.

A number of other firewalls support an advanced packet filtering technique known as stateful inspection, which tracks the context or state of network activity. This hybrid technology intercepts packets at the network layer, then extracts application layer information used to track and control connections. Among the vendors that support this scheme are Check Point Software Technologies, Ltd., Global Technology Associates, Inc., LanOptics, Inc., Network-1 Software and Technology, Inc. and ON Technology Corp.

Ira Machefsky, Internet analyst at Giga Information Group in Santa Clara, Calif., says stateful inspection functionality has moved into routers and other network access equipment that previously filtered solely on network addresses. Bay Networks, Inc. and Check Point, for example, have formed an alliance to move Check Point's stateful architecture into Bay's routers. Ascend Communications, Inc. bought MorningStar Technologies, Inc., another stateful inspection vendor, and is assimilating MorningStar's technology into its network access products. And Cisco Systems, Inc., Machefsky says, has developed its own stateful technology that it now sells as Cisco PIX.

Another trend involves the underlying operating systems firewall vendors use. Until recently, most firewalls were Unix-based, but now Windows NT-based offerings are coming on strong. NT-based products provide reasonable security, but as a relatively new operating system with millions of lines of code, there are bound to be security holes you haven't heard about yet, says Ted Julian, Internet research manager at International Data Corp. in Framingham, Mass.

However, as our review clearly shows, NT-based firewalls can be more easily configured than their Unix counterparts, which should minimize the potential for security breaches, Julian says.

"You might not have to worry about NT if you work in a small or medium-size company," says Michael Zboray, vice president of network security at Gartner Group, Inc. in Stamford, Conn. Rather, he says, vendors, including Seattle Software Labs, Inc., Secure Computing Corp. and Cisco, offer shrink-wrapped products that require minimal configuration via a point-and-click interface.

Signs indicate that before too long, there will be large-scale deployment of Internet-based VPNs, which are secure chunks of the public Internet that you carve out using encryption. "This is a must-have for any time-sensitive data that is going across public lines and is also important for international links," says Allen Leibowitz, president of Anzen Computing, Inc. in Ann Arbor, Mich. He points out that you can save big by tapping Internet service providers to link your sites instead of using leased lines.

Most vendors include proprietary encryption software in their firewalls. However, several vendors, along with TCP/IP stack vendors and encryption company RSA Data Security, Inc., are trying to define packet encryption interoperability standards. Dubbed the S/WAN initiative, this effort is moving to implement the IETF IPSec security standard for IP Version 6, the next-generation Internet Protocol.

The security that firewalls offer is also now extending to how they are administered. Advances in encryption technology and authentication tools are making for more secure remote administration. Several com-

Still need more data before deciding which firewall is best for you? Enter the number below in the DocFinder box on the home page and you'll find:

- ● Additional product comparison charts
- ● The home page of the Computer Operations, Audit and Security Technology research program at Purdue University. This site maintains a list of books and technical papers about firewalls. It also has links to sites for downloading tools to create your own firewall or documents that help you set up firewall tests. A listing of firewall-related mailing lists, newsgroups and interactive conferences is also hosted here.
- ● A free firewall evaluation checklist from security consulting firm Fortified Networks
- ● The National Computer Security Association's site where you'll find information about the NCSA's Firewall Certification Program
- ● An overview of "The Firewall Report" published by market research firm Outlink
- ● A public domain firewall shareware site
- ● A firewall FAQ

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panies provide centralized management of multiple firewalls. These include Check Point, Raptor Systems, Inc. and Trusted Information Systems, Inc. (TIS). However, Peter Vogel, editor in chief of "*The Firewall Report*", published by Glen Head, N.Y., market research firm Outlink, Inc., says users will soon need vendors to provide them with tools for integrating the management of security policies across multiple firewalls, routers and servers.
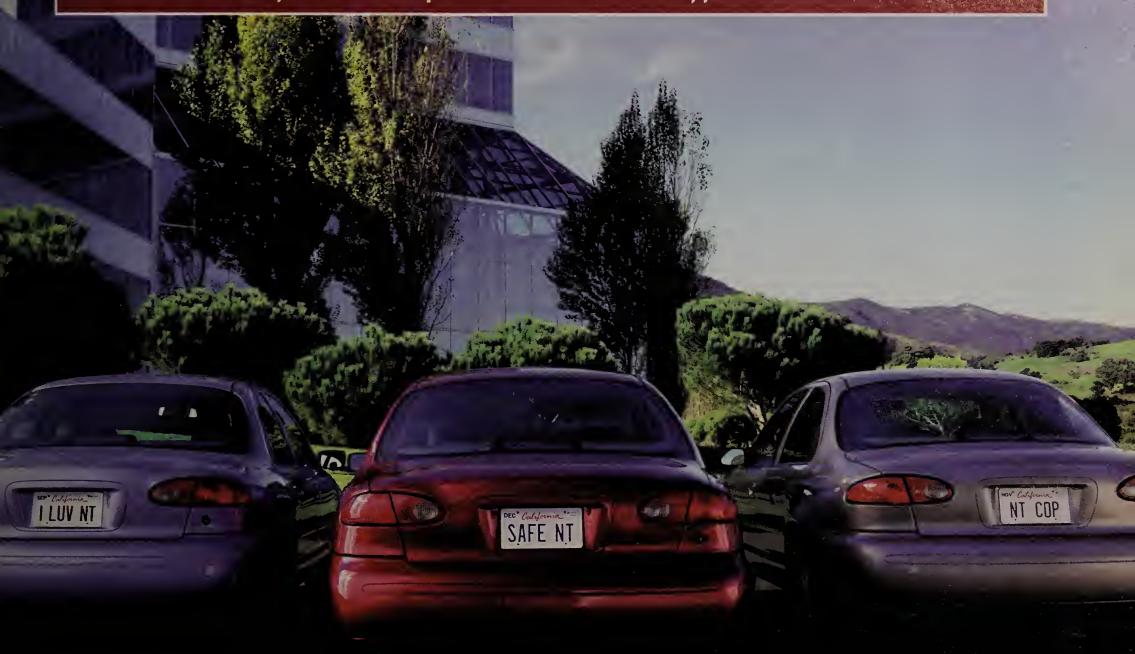
A potential tiebreaker in your firewall decision, Gartner's Zboray says, is the age of the source code. It's likely most of the bugs have been worked out of code from the more mature players, notably TIS. Ron Hale, senior manager of computer assurance services at Deloitte & Touche LLP in Chicago, says even after you've settled on a firewall, you should periodically revisit the product's effectiveness. "It is not like buying a server or database, where you have a long-term commitment," he says. "The product you have today may not protect you against future threats." He recommends working with a vendor that has a long track record, a robust product and that routinely deploys fixes to address newfound 'Net threats. ■

| | Product | Operating system | LAN types supported | | | | | | Minimum hardware configuration | | Reports | Invalid access action | Console interface | Price |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATM | Ethernet | Fast Ethernet | FDDI | Token ring | Platform dependent | For firewall with 500 concurrent internal users browsing the Web | For firewall with a single T-1 internal connection | Summaries by: | Notifications distributed via: | | S: Software only B: Bundled hardware/ software O: Other |
| AltaVista Internet Software, Inc. (800) 336-7890 http://altavista.software.digital.com | AltaVista Firewall for Unix 2.1, AltaVista Firewall for NT 1.1 | Unix, Windows NT | | | | | | ● | CPU: 80486, Pentium or AlphaStation/133 MHz RAM: 96M bytes (1) CPU: AlphaStation 500/ No speed given RAM: 96M bytes (2) | CPU: 80486, Pentium, or AlphaStation/90 MHz RAM: 64M bytes (1) CPU: AlphaStation 300/ No speed given RAM: 64M bytes (2) | User ID, IP address, other | E-mail, pager, programmable alerts, Unix syslog | GUI | S: $3,995+ |
| ANS Communications, Inc. (800) 456-8267 http://www.ans.net | ANS InterLock Service 4.0 | Customized Unix | | ● | ● | ● | ● | | CPU: SPARC 20/ 75 MHz RAM: 64M bytes | CPU: SPARC 20/75 MHz RAM: 64M bytes | User ID, IP address, other | E-mail, SNMP trap, Unix syslog, other | Command line, GUI | S: $14,800+ B: $15,900+ |
| Ascend Communications, Inc. (800) 621-9578 http://www.ascend.com | Secure Access Manager 1.0 | Proprietary | | ● | ● | ● | | | NA | NA | IP address | E-mail, SNMP trap, Unix syslog | GUI | S: $500-$20,000 |
| Atlantic Systems Group, Inc. (506) 453-3505 http://www.asg.unb.ca | TumStyle Firewall System 3.1 | Customized Unix, Unix | | ● | | | | | CPU: Pentium/166 MHz RAM: 64M bytes | NA | | E-mail, other | Command line, GUI | S: $3,995-$11,000 |
| Aventail Corp. (888) 762-5785 http://www.aventail.com | Aventail Security Manager Version 2.0 | Linux, Unix | | | | | | ● | CPU: Pentium Pro/ 180 MHz RAM: 96M bytes | NA | User ID, IP address basis | Unix syslog | GUI | S: $1,495-$25,995 |
| BBN Planet (800) 427-4565 http://www.bbn.com | Site Patrol 2.4 | Customized Unix | | ● | | | ● | | CPU: Pentium/166 MHz RAM: 64M bytes | CPU: Pentium/166 MHz RAM: 64M bytes | User ID, IP address | E-mail, SNMP trap, Unix syslog, other | NA | O: $5,000 installation and $2,500 per month |
| *Check Point Software Technologies, Ltd. (800) 429-4391 http://www.checkpoint.com | Check Point FireWall-1 2.1 | Unix, Windows NT | ● | ● | ● | ● | ● | ● | CPU: Pentium/100 MHz RAM: 32M bytes (1) CPU: SPARC 5/110 MHz RAM: 32M bytes (2) | CPU: Pentium/133 MHz RAM: 64M bytes (1) CPU: UltraSPARC/143 MHz RAM: 64M bytes (2) | User ID, IP address, other | E-mail, pager, programmable alerts, SNMP trap, Unix syslog | Command line, GUI, Web browser | S: $4,990-$18,900 |
| Cisco Systems, Inc. (800) 553-6387 http://www.cisco.com | Cisco PIX Firewall 3.0 | Proprietary | | ● | ● | | ● | | NA | NA | IP address | SNMP trap, Unix syslog | Command line, Web browser | B: $9,000+ |
| CyberGuard Corp. (954) 973-5478 http://www.cyberguardcorp.com | CyberGuard Firewall 3.1 | Customized Unix | | ● | ● | ● | | | CPU: Dual Pentium Pro/200 MHz RAM: 32M bytes | CPU: Pentium Pro/200 MHz RAM: 32M bytes | User ID, IP address, other | E-mail, pager, SNMP trap, Unix syslog | Command line, GUI | S: $9,995-$19,995 B: $15,000-$29,000 |
| Cycon Technologies (703) 383-0247 http://www.cycon.com | Labyrinth 1.4 | Customized Unix | | ● | ● | ● | | | CPU: Pentium/166 MHz RAM: 64M bytes | CPU: Pentium/100 MHz RAM: 32M bytes | IP address | E-mail, Unix system, local program | Command line, GUI, Web browser | S: $3,595-$8,695 B: $4,895-$10,995 |
| FTP Software, Inc. (508) 685 4000 http://www.ftp.com | Internet Gateway for NetWare 1.0 | NetWare 3.X or 4.X | | ● | | ● | ● | | CPU: Pentium/100 MHz RAM: 32M bytes | CPU: Pentium/100 MHz RAM: 32M bytes | User ID | Journal file | GUI | S: $975-$7,995 |
| Gemini Computers, Inc. (408) 373-8500 http://www.geminisecure.com | Gemini Trusted Security Firewall-Guard Systems 1.02 (3) | Proprietary | | ● | ● | | | | CPU: Pentium/ 90-200 MHz RAM: 16M bytes+ | CPU: Pentium/90-200 MHz RAM: 16M bytes+ | IP address | Separately configured Audit Server, Unix syslog | Command line, GUI | B: $9,500+ per domain |
| Global Internet Software Group, Inc. (800) 682-5550 http://www.globalinternet.com | Centri Firewall Version 3.1.2 | Windows NT | | | | | | ● | CPU: Pentium/166 MHz RAM: 64M bytes | CPU: Pentium/120 MHz RAM: 32M bytes | | | GUI | S: $5,000-$15,000 |
| Global Technology Associates, Inc. (800) 775-4482 http://www.gta.com | GNAT Box 1.1 | Modified Unix kernel | | ● | ● | ● | | | CPU: Pentium/133 MHz RAM: 8M bytes | CPU: 80486/100 MHz RAM: 8M bytes | IP address | | Command line, Web browser | S: $995 |
| | GFX Internet Firewall 3.0 | Customized Unix | | ● | ● | ● | ● | | CPU: Pentium/133 MHz RAM: 16M bytes | CPU: 80486/100 MHz RAM: 16M bytes | IP address | E-mail, pager, SNMP trap | GUI | B: $14,000-$19,000 |
| IBM (800) 426-333 http://www.ibm.com | IBM Firewall 2.2 | Customized Unix | ● | ● | ● | ● | ● | | CPU: PowerPC 604e/ 133 MHz RAM: 32M bytes | CPU: PowerPC 604e/ 133 MHz RAM: 32M bytes | User ID, IP address, other | E-mail, pager, SNMP trap, Unix syslog | Command line, GUI, Java | S: $10,000 |
| Information Resource Engineering, Inc. (410) 931-7500 http://www.ire.com | SafeNet/Firewall | Customized Unix | | ● | ● | ● | | | CPU: Dual Pentium Pro/200 MHz RAM: 32M bytes | CPU: Dual Pentium Pro/ 200 MHz RAM: 32M bytes | User ID, IP address, other | E-mail, pager, SNMP trap, Unix syslog | Command line, GUI | B: $18,995 (4) |
| LanOptics, Inc. (972) 738-6900 http://www.hotsites.net/lanoptics | Guardian 2.1 | OS/2, Windows NT | | | | | | ● | CPU: Pentium/133 MHz RAM: 32M bytes | CPU: Pentium/133 MHz RAM: 32M bytes | User ID, IP address, other | SNMP trap | GUI | S: $3,980-$6,980 |
| Livermore Software Laboratories International, Inc. (713) 974-3274 http://www.lsli.com | PORTUS Secure Firewall 2.2 | Unix | | | | | | ● | CPU: PowerPC 604 RAM: 32M bytes | CPU: PowerPC 604 RAM: 64M bytes | User ID, IP address, other | User ID, IP address, other | User ID, IP address, other | S: $3,000-$10,000 |

Footnotes: (1) Running under Windows NT. (2) Running under Unix. (3) This product consists of middleware that is linked to other systems to provide firewall functionality. (4) Price includes Date Encryption Standard encryption. (5) Assumes no encryption is taking place. (6) SunScreen SPF 100 will be replaced by SunScreen SPF-200 in the first quarter of 1997. NA – Not applicable. Products highlighted in red and blue were tested. *The Blue Ribbon Award winner.

CHART COMPILED BY JIM BROWN

| Company | Product | Operating system | LAN types supported | | | | | | Minimum hardware configuration | | Reports | Invalid access action | Console interface | Price |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATM | Ethernet | Fast Ethernet | FDDI | Token ring | Platform dependent | For firewall with 500 concurrent internal users browsing the Web | For firewall with a single T-1 internal connection | Summaries by: | Notifications distributed via: | | S: Software only B: Bundled hardware/ software O: Other |
| Livingston Enterprises, Inc. (800) 458-9966 http://www.livingston.com | Firewall IRX-211 Router 3.2.1R | Proprietary | | ● | | | | | NA | NA | | | Command line, GUI | B: $3,195 |
| McAfee (408) 988-3832 http://www.mcafee.com | WebWall 1.0 | Proprietary | | ● | ● | | ● | | CPU: 80486/90 MHz RAM: 32M bytes | NA | | Unix syslog | GUI, menuing system | S: $9,995 |
| Milkyway Networks Corp. (408) 566-0800 http://www.milkyway.com | Black Hole 3.0 | Customized Unix | | ● | ● | | ● | | CPU: SPARC 5 or Pentium/166 MHz RAM: 32M bytes | CPU: SPARC 5 or Pentium/166 MHz RAM: 32M bytes | User ID, IP address | | GUI | S: $2,950-$20,500 |
| Network Engineering Technologies, Inc. (408) 453-7500 http://www.fireants.com | Telaxian Shield 2.0 | Linux, Unix | | | | | | ● | CPU: SPARC 5/110 MHz RAM: 32M bytes (5) | CPU: SPARC 5/110 MHz RAM: 32M bytes (5) | User ID, IP address, other | E-mail, pager, Unix syslog | Command line, GUI, Web browser | S: $7,995-$11,995 |
| Network-1 Software & Technology, Inc. (212) 293-3068 http://www.network-1.com | FireWall/Plus for Windows NT 3.0 | Windows NT | | ● | ● | | ● | | CPU: Alpha/433 MHz RAM: 128M bytes | NA | IP address, other | E-mail, pager, Unix syslog | GUI | S: $995-$15,000 |
| Novell, Inc. (800) 637-9273 http://www.novell.com | IntranetWare | NetWare 4.11 | ● | ● | ● | ● | ● | ● | CPU: Pentium/100 MHz RAM: 32M bytes | CPU: Pentium/100 MHz RAM: 16M bytes | | Event processor facility and add-on packages | GUI | S: $1,095-$47,995 |
| ON Technology Corp. (800) 767-6683 http://www.on.com | ON Guard 1.08 | Proprietary | | ● | | | | | CPU: 80486/66 MHz RAM: 4M bytes + | CPU: 80486/66 MHz RAM: 4M bytes + | IP address | | GUI | S: $4,995 B: $6,490 |
| Quarterdeck Corp. (800) 225-8148 http://www.qdeck.com | IWare Connect 2.02 | NetWare 3.X or 4.X | | ● | ● | ● | ● | | CPU: Pentium/166 MHz RAM: 32M bytes | CPU: Pentium/166 MHz RAM: 32M bytes | User ID, other | User-configurable command line | GUI | S: $9,000 |
| Radguard, Ltd. (201) 909-3745 http://www.radguard.com | PyroWall 1.7 | Proprietary | | ● | | | ● | | NA | NA | IP address | Physical alarm, SNMP trap | GUI | B: $6,000-$13,000 |
| Raptor Systems, Inc. (617) 487-7700 http://www.raptor.com | Eagle 4.0 | Unix, Windows NT | | ● | ● | ● | ● | | CPU:Pentium /166 MHz, UltraSPARC/167 MHz, HP 9000/831 MHz, Alpha/266 MHz RAM: 96M bytes | CPU: Pentium/120 MHz, SPARC/75 MHz, or HP 9000/710 MHz RAM: 64M bytes | User ID, IP address, other | Audible alert, E-mail, pager, programmable alerts SNMP trap | GUI | S: $6,500-$7,000 |
| Seattle Software Labs, Inc. (206) 521-8340 http://www.sealabs.com | WatchGuard Security System 2.10 | Customized Unix | | ● | | | | | NA | NA | IP address, other | E-mail, pager, programmable alerts, Unix syslog | GUI | B: $3,495 |
| Secure Computing Corp. (800) 334-8195 http://www.sctc.com | BorderWare Firewall Server 4.0.1 | Customized Unix | | ● | ● | ● | ● | | CPU: 80486/32 MHz Pentium: 133/64 MHz RAM: 32M bytes | CPU: 80486/32 MHz Pentium: 133/64 MHz RAM: 32M bytes | IP address | E-mail, pop-up windows | GUI, Java-based GUI | S: $4,000-$14,000 |
| Sterling Commerce (972) 868-5000 http:// www.stercomm.com | Connect: Firewall 2.5 | Unix, Windows NT | | ● | | | ● | | CPU: SPARCstation 10/No speed given RAM: 32M bytes | CPU: SPARCstation 5/No speed given RAM: 32M bytes | User ID, IP address, other | E-mail, pager, programmable alerts, Unix syslog | Command line, GUI | S: $6,000-$16,500 |
| Sun Microsystems, Inc. (415) 336-0624 http://www.incog.com | SunScreen EFS 1.0 | Unix | | ● | ● | | | | CPU: UltraSPARC 140/143 MHz RAM: 32M bytes | CPU: SPARC 5/110 MHz RAM: 16M bytes | IP address, other | SNMP trap | Command line, GUI, Web browser | S: $4,995-$14,995 |
| | SunScreen SPF-100 1.0 (6) | Scaled down Unix | | ● | | | | | Not specified | Not specified | IP address, other | SNMP trap | Command line, GUI, Web browser | B: $20,000-$85,000 |
| 3Com Corp. (800) 638-3266 http://3com.com | NETBuilder IP Firewall | Proprietary | ● | ● | ● | ● | ● | | NA | NA | Packet/ application filters | E-mail, SNMP trap | Command line | O: Firewall is bundled with NETBuilder product |
| Technologic, Inc. (770) 522-0222 http://www.tlogic.com | Interceptor 2.0 | Customized Unix | | ● | ● | ● | ● | | CPU: Pentium/166 MHz RAM: 32M bytes | CPU: Pentium/120 MHz RAM: 16M bytes | User ID, IP address | E-mail, pager | Command line, GUI, Web browser | S: $5,995-$11,495 B: $9,330-$14,830 |
| Trusted Information Systems, Inc. (888) 347-3925 http://www.tis.com | Gauntlet 3.2 | Unix, Windows NT | | | | | | ● | CPU: UltraSPARC, HP 9000/No speed given RAM: 128M bytes | CPU: Pentium/100 MHz RAM: 40M bytes | User ID, IP address | E-mail, Unix syslog | Command line, GUI | S: $99-$11,500 B: $5,500-$23,000 |
| V-one Corp. (301) 838-8900 http://www.v-one.com | SmartWall 3.3 | Unix | | ● | | | ● | ● | CPU: Pentium/133 MHz RAM: 32M bytes | CPU: Pentium/133 MHz RAM: 32M bytes | User ID, IP address | E-mail, Unix syslog | Command line, GUI | S: $12,500 B: $20,000 |

Footnotes: (1) Running under Windows NT. (2) Running under Unix. (3) This product consists of middleware that is linked to other systems to provide firewall functionality. (4) Price includes Date Encryption Standard encryption. (5) Assumes no encryption is taking place. (6) SunScreen SPF 100 will be replaced by SunScreen SPF-200 in the first quarter of 1997. NA = Not applicable. Products highlighted in red and blue were tested. *The Blue Ribbon Award winner.

CHART COMPILED BY JIM BROWN

# HEAD-TO-HEAD

# IP switching is hot. Why is your approach hotter than theirs?

**BY LARRY LANG**

Why is IP switching better than Tag Switching? Because IP switching is real and Tag Switching currently is not.

Ipsilon Networks, Inc. introduced IP switching last March, won "Best of Show" at NetWorld+Interop 96 in Las Vegas last April and began shipping its first IP switching products that same month.

Last August, less than six months after the debut of IP switching technology, more than 20 vendors participated in the first IP switching interoperability test. And last September at NetWorld+Interop 96 in Atlanta, Ipsilon hosted a public interoperability showcase featuring IP switching products from a dozen vendors.

In reaction to this unprecedented momentum for IP switching, Cisco Systems, Inc. announced its newest marketing concept, Tag Switching.

The press has gotten caught up in Cisco's game by promoting Tag Switching as Cisco's alternative to IP switching. This is an apples-to-oranges comparison, since Tag Switching is "white paperware," while IP switching has been incorporated in products now shipping.

The newest angle to Cisco's marketing game is its grandstand pledge to open up the draft Tag Switching specifications to public debate.

Perhaps a better clue to the company's intent can be found in a statement tacked to the end of the draft Tag Switching specification: "Cisco Systems may seek patent or other intellectual property protection for some or all of the technologies disclosed in this document."

In contrast, Ipsilon has taken the Internet Engineering Task Force approach to interoperability, where the road to establishing standards depends on real implementations, not theoretical debates. We have a strong business incentive to make IP switching technology widely available, down to providing reference code to assist portability efforts.

The number of partners already implementing the technology bears witness to Ipsilon's success in propagating IP switching across a broad range of applications and platforms.

Cisco's move to openness further blurs the already indistinct definition of Tag Switching and presents the company with a new dilemma. Because Cisco has no working implementation of Tag Switching, its proposal is no more valid than the multiple competing specifications already presented to the newly instituted Tag Switching debating society.

As far as features such as scalability are concerned, let's judge the scalability of Tag Switching when it can be tested in real products and real networks. It will be mid-1997 at least before any customer will be able to test-drive the first generation of Tag Switching technologies.

IP switching products are already in use, allowing us to tune the technology for different types of traffic through implementation and experimentation. By next summer, IP switching technology and products will have grown even more robust based on this experience.

Many users have network congestion and performance problems right now. All the white papers in the world won't solve these problems. Ipsilon is focused on customer solutions, and IP switching is our reaction to customers' needs. Cisco's Tag Switching proposal is clearly a reaction to IP switching.

*Lang is vice president of product management for Ipsilon Networks, Inc. He can be reached via the Internet at llang@ipsilon.com.*

**BY TOM DOWNEY**

It's simple: Tag Switching is all about creating an open and flexible standard to scale real-world routed and switched backbones. IP switching is not.

Today, users demand standards-based, interoperable products. That's why Cisco Systems, Inc. has invited the industry to join it in creating a single, multi-vendor standard to be presented to the Internet Engineering Task Force. Recognizing the crucial role standards play in today's enterprise and service provider networks, Cisco announced Tag Switching to jump-start this effort.

Tag Switching delivers three critical pieces that are missing from IP switching: scalability, flexibility and efficiency. Tag Switching is topology-driven while IP switching is traffic-driven. This is a key distinction in understanding scalability. Tag Switching pre-assigns tags to routes using common routing protocols, while IP switching creates individual flows for each pair of communicating PCs, workstations and servers. As a result, Tag Switching avoids the huge volume of setup and tear-down overhead that is characteristic of flow switching, and is vastly more scalable.

Tag Switching also increases scalability by supporting hierarchical tags. This technique can protect the backbone from outside routing instabilities and reduce the size of backbone routing tables. IP switching has no such capability. Supporting hierarchical tags also enables Tag Switching to route across administrative domains. In contrast, the large and rapidly growing number of flows across domains makes flow-based schemes impractical.

When it comes to flexibility, Tag Switching meets the specific needs of real-world networks. Multiprotocol support is designed into Tag Switching, not treated as an afterthought. Tag Switching also supports cell or frame tagging on a wide range of media, coexists with ATM protocols on the same switch, and provides class-of-service capabilities based on either precedence levels or the Resource Reservation Protocol.

These capabilities enable a smooth migration to Tag Switching from both routed and switched environments.

Then there's efficiency. Tag Switching's topology-driven approach enables switching of both short- and long-lived flows at high speed. IP switching only accelerates long-lived flows and is very sensitive to specific traffic patterns. Should new applications make use of short-lived flows, Tag Switching's future-safe approach can accelerate them; IP switching cannot. Tag Switching also supports advanced traffic engineering capabilities for optimization of WAN links, a feature missing from IP switching.

Customers realize that no single technology can provide networked nirvana. In contrast to IP switching, Tag Switching was developed as part of a family of multilayer switching solutions that includes NetFlow switching, which complements Tag Switching by speeding network layer services, and Multi-Protocol over ATM, which provides high-performance routing between virtual LANs. Customers choose what's best, based on the problem they want to solve.

In the end, Tag Switching is a superset of IP switching, supporting applications in both enterprise and service provider networks. But more important to customers, Tag Switching will gain widespread acceptance from the industry within the context of networking standards. In today's fast paced networked world, users will settle for nothing less.

*Downey is director of product marketing for Cisco Systems' Core Products Business Unit. He can be reached via the Internet at downey@cisco.com.*

# Management Strategies

**Covering:** Career Insights and Innovations
in Managing Staff, Budgets and Technology

# Microsoft certification challenge: Keep up with the changes

**By Connie Brown**

Studying hard and passing exams aren't the only challenges you face in gaining Windows NT certification. You'll also need to stay on top of frequent changes in course requirements and rules for keeping or upgrading your certification.

It can be a frustrating task. Just ask John Osborne, a Microsoft Certified Product Specialist (MCPS) in Windows NT 3.51 at Star Banc Corp. in Cincinnati. Osborne was preparing to become a Microsoft Certified System Engineer in NT 3.51 when Microsoft introduced a new MCSE track devoted to NT 4.0 that will eventually replace the 3.51 certification.

Osborne says his efforts to become certified in NT 3.51 were a waste of time and money because that version of the operating system eventually will be deemed outdated. Rather than shell out the $2,000 he was paying for each of the four required and two elective courses and dropping about another $100 to take the tests, Osborne opted to stop chasing the MCSE title. He'll use his MCPS title and on-the-job experience toward advancing his career.

For its part, Microsoft realizes constant program changes and difficulties in communicating how students are affected by them are a cause of great frustration for participants. The company is taking steps to deal with those problems, says Elizabeth Fox, manager of certification marketing at Microsoft.

"Microsoft strives to make the program as acceptable to everyone as possible. We don't want the cost of the training offerings to be a burden to individuals; we look to cut costs wherever possible," Fox says.

Claiming there have been no major changes recently, Fox did say there have been some tweaks. "We added new core and elective exams and have retired some obsolete exams."

Fox also says the addition of the NT 4.0 track to the MCSE program last March doesn't affect certification in NT 3.51. In fact, the NT 3.51 track is still offered. However, credits earned when passing NT 3.51 certification exams don't count toward an MCSE in NT 4.0.

When Microsoft eventually retires NT 3.51 certification, MCSEs for that product will be given six months to take NT 4.0 certification exams if they want to keep their MCSE titles. They will receive a 50% discount on those exams.

Determining the appropriate time to retire a certification exam takes quite a bit of research and industry monitoring, Fox says. For example, Microsoft only recently retired its two LAN Manager exams in favor of one on NT Server 3.1. Before it retires an exam, Microsoft identifies how many companies are still using old technology. "We wait until the world is ready to move forward before retiring an exam," Fox says.

As frustrating as it may be to keep up to date with changes in Microsoft's certification programs, doing so can pay dividends as demand for NT experts

skyrockets. Perhaps that demand is why so many Microsoft Authorized Technical Education Centers have experienced a significant jump in NT course registration.

"One reason is that NT is an incredibly stable network that works well with many of the software applications companies are currently using," says David Anderson, certification administrator at Product Point International, a training firm in Austin, Texas.

What Microsoft and its certification seekers are learning is that as the demand for new products increases, new courses will evolve and program changes will keep coming. For instance, Microsoft says it will be adding new elective courses to its MCSE program within the next six months. Those courses will cover Microsoft's Internet Information Server Version 3.0, as well as its Proxy Server and TCP/IP products, and are aimed at individuals looking to specialize in Internet technology.

*Brown is a freelance writer in Virginia Beach, Va., and author of the forthcoming book How to Hook a Big Job with a Little Fishing Pole. She can be reached at Cbrown1737@aol.com or (757) 631-9379.*

## Lessons learned at Novell

**N**ovell, Inc. understands what Microsoft Corp. is going through in keeping certification candidates well informed about program changes and ways to apply existing credits to new programs.

After all, Novell faced similar problems with its popular Certified Novell Engineer (CNE) program, says David Marler, marketing manager for skills assessment in Novell's education unit. "Vendors, including Microsoft, have learned a lot from us as far as certification is concerned," he says.

Novell has learned to take a very methodical approach to updating, enhancing and modifying programs, he explains. All program changes are the result of extensive research and job task analysis. Novell confirms the research by keeping abreast of what Novell certified professionals are doing in the industry and at customer sites on a daily basis.

The company's programs are designed to meet industry needs and are modified when technology and industry direction warrants, Marler says. Novell also tries to help users apply their experience with older products toward certification in new ones.

For example, anyone certified in NetWare 3.X can participate in a Cross Certification program that permits them to apply their 3.X experience toward 4.X certification. The Cross Certification program also requires NetWare 3.X CNEs to pass fewer exams than someone without a 3.X certificate to become a NetWare 4.X CNE. Once they enroll, NetWare 3.X CNEs are given 12 to 18 months to complete the Cross Certification program.

Novell also expanded its Master CNE program last December to cover multivendor integration issues. A Client/Network Solutions Track within the program enables individuals to learn how to integrate leading technologies such as NT Server, IBM's Application System/400 and The Santa Cruz Operation, Inc.'s Unix-based servers into a Novell IntranetWare environment.

In addition, Novell announced an Internet/Intranet Solutions Track that gives individuals the skills needed to create Internet/intranet infrastructures for their organizations.

— *Connie Brown*

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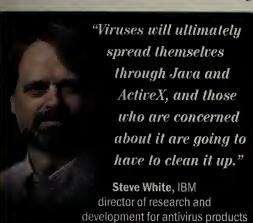
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## ActiveX

The ActiveX problem is simple. The technology is based on OLE, which allows one application to launch another. By definition, then, ActiveX has the potential to access a user's hard drive, and control applications and files. Java applets, in general, are currently not allowed to access a hard drive or files, or open up new net connections.

Lockheed will wait for Microsoft to resolve these issues before endorsing ActiveX.

### Search for a cure

In fact, the antivirus industry is now predicting that the next virus avalanche will be delivered through ActiveX Controls. And this time, the industry admits, it does not know if the controls can save you.



"Viruses will ultimately spread themselves through Java and ActiveX, and those who are concerned about it are going to have to clean it up."

**Steve White, IBM**
director of research and development for antivirus products

The malicious-code underground — such as the Phalcon/Scism gang, named by one antivirus product vendor — always picks popular software and the easiest network delivery as the host for their viruses to propagate. Right now, Microsoft is very popular.

"Computer viruses spread exactly the way live forms spread — through hospitable environments," says Steven White, IBM's director of research and development for antivirus products.

While no one claims to have seen an ActiveX-based computer virus, everyone — including Microsoft — knows they are coming. There is already a hostile ActiveX applet called Exploder on the World-Wide Web, which can delete files or reformat drives. But it does not technically count as a virus because it does not remain resident on your computer system after you leave the Web site.

If ActiveX, which extends Microsoft's OLE controls to the Internet, becomes as popular as Microsoft would like, it is certain to become a particularly effective way to deliver computer viruses that simple desktop software will not be able to eradicate.

"ActiveX can access any native Windows call, and that means any ActiveX applet you execute on your computer can do what any virus can do," says Eva Chen, chief technology officer at Trend Micro Systems, Inc.

Dale Cross, technical consultant at Fairfax, Va.-based Norman Data Defense Systems, Inc., says the virus underground has already developed a set of tools for writing macroviruses using OLE, and it is just a matter of time before it gets to ActiveX.

The antivirus industry also views Java applets with suspicion. But Java does not interact with applications and files as intimately as ActiveX. Sun Microsystems, Inc., recognizing the threat early on, built a security manager, dubbed the sandbox, into Java that offers some checks.

But Java may not exactly be immune to ActiveX viruses. According to Larry Cable, senior staff engineer in Sun's JavaSoft division, it is possible to write a Java application that could download ActiveX, Windows and Unix data link libraries without any security manager controls. "In that case, the policy for the security manager would depend on the policy you want to implement," Cable says.

ActiveX, however, has no sandbox built into it. "Clearly, it's a great concern, and the solution is not well understood at this point," acknowledges Cornelius Willis, Microsoft's group product manager for Internet platforms, about the threat of computer viruses in ActiveX. He says digital signatures at least offer reassurance about the origin of signed code.

Willis says there is a need for much more research in the virus area to combat ActiveX. "I don't think prophylactic approaches will work very well."

Antivirus vendors often claim to have all the answers but say they are stumped on exactly how to treat the ActiveX problem.

"ActiveX, which acts like a small box, a container that can hold documents, spreadsheets and many other things, is our No. 1 problem today," says Shimon Gruper, chief executive officer of Pembroke Pines, Fla.-based antivirus vendor, Eliashim.

In general, antivirus products have a hard time finding Trojan horses with delayed activities, and if they appear in a computer system via hostile ActiveX Controls, they will not always be traceable, Gruper says.

To stop viruses that might be delivered via ActiveX or Java could require a new mode of virus detection that would scan a datastream before it hit the desktop.

IBM's White said IBM is at work on an "immune system for cyberspace" that may offer an approach to checking ActiveX and Java datastreams on the fly. The IBM immune system will also be able to scan the desktop and isolate suspicious code, packaging it for delivery over the 'Net to IBM's research lab, where automatic scanning will kill it. ■

## Antivirus vendors brace for Office97

Aware that computer "macroviruses" are a growing menace to the Windows community, Microsoft Corp. has included virus protection in its Office97 suite of applications.

But IBM and Symantec Corp., contending it is not enough, will soon release their own products to eradicate Lunch, Niceday and Rapi.C viruses. These viruses, built for earlier Office releases, are masked by Office97 applications, the vendors claim.

"They are changed in form and hidden from the previous generation of antivirus software by Office97," says Steve White, IBM director of research and development for antivirus products.

IBM this month will ship AntiVirus 2.5.2., which is basically an Office97 vaccination kit.

Symantec plans to release its Office97 antivirus product in March. "There is some protection in Office97, but it includes fewer than 10 of the currently known macroviruses. There are probably 40," says Alex Haddox, Symantec product manager.

*—Ellen Messmer*

## Opera

new features, Opera's creators have kept their offering lean and mean. Weighing in at less than 1M byte — compared with the multimegabyte sizes of even the barest Netscape and Microsoft offerings — Opera will run comfortably on the 386SX you have gathering dust in a back office.

"Microsoft and Netscape are making it easy for us," von Tezchner said. "They keep getting bigger and slower, and require more resources."

Opera also promises users greater flexibility, letting them easily switch off frames or annoying flashing ads, for example. To be sure, Opera lags behind the giants in supporting state-of-the-art items such as Java, but von Tezchner argues few Web sites use the latest technology.

Von Tezchner estimates more than 100,000 end users already are running the program, and he and Ivarsoy are just starting to market it internationally. "We intend to make Opera a major player," von Tezchner said. "We are a small company, but it would not be the first time that a small company does well against bigger opponents."

Of course, the initial plans were not that ambitious. Von Tezchner and Ivarsoy saw a need for a better browser in the days when Netscape was building a monopoly.

So along with a hired consultant, they set to work in the summer of 1994 — but only part-time, while working for Telenor, the Norwegian telephone company.

But by the summer of 1995, they were so proud of their work, they established Opera Software and worked there full-time.

Last summer, they launched a Windows 3.11 version on the World-Wide Web. In December, they released a 32-bit version.

Von Tezchner said they are striving to make Opera more flexible and easier to use, and have begun work on an OS/2 version. They are also upgrading the browser to support JavaScript, Secure Sockets Layer and Netscape plug-ins. Java and ActiveX will have to wait.

Von Tezchner said he and Ivarsoy want to retain control over the program but could strike a deal with investors or a larger company.

Opera is available on the Web at http://opera.nta.no/. ■

Opera delivers pretty much what it promises: It is a lightweight, fast Web client that keeps up with the increasingly bloated browsers from Netscape Communications Corp. and Microsoft Corp. Download a 900K file for a client that supports tables, frames and in-line videos and that has a Usenet reader at least the equal of Netscape's and Microsoft's.

Opera even has some features the better known browsers do not. One of the most useful is its ability to link two browser windows so the output from clicking on a hyperlink in one window shows up in the other. This is particularly handy when doing heavy-duty searches on servers such as AltaVista, or when reading Usenet messages that refer to Web sites; you do not have to keep hitting your Back button or Alt-Tab to return to the original page.

Another feature is great for people who cannot stand all those flashing, animated GIF displays. Opera can sense these images and show only the first frame in the display (so you get an idea of what the image is without having to watch it endlessly flash). You can also disable frames.

Opera does not support Java or ActiveX (some might argue that is a feature) or Netscape plug-ins (you can associate particular file types with applications). The software does have some quirks: Where Netscape has an Open button for entering in URLs, Opera wants you to click on Direct. Opera also tries to display hyperlinks in a thin three-dimensional box. Unfortunately, some of the lines that make up the box are white, which makes for odd-looking hyperlinks on sites that have white backgrounds.

Opera comes in Windows 3.1 and 95 versions, with pricing starting at $30 per license.

*—Adam Gaffin*

## Cisco

on top of 30%?" asked James Wiedel, director of networking in USC's computer services department. "The main problem is, when you start out with a very high price, even a 30%, 35% discount is still a high price. It's unfortunate that they couldn't dig deeper into that discount rate to make it 50% or a little more."

"The main thing that I would be concerned about is that they continue to support the 7000, at least for a period of time," said Tom Hall, director of telecommunications at insurance holding company AEGON USA, Inc. in Cedar Rapids, Iowa.

A Cisco spokesman said the 7000 will be supported for "a couple of years" more. But as an added incentive to get users over to the 7500, Cisco unveiled a number of enhancements for it and for the 7200 router that together quadruple performance yet cut per-port prices in half, the company said.

The enhancements include a new RSP (the RSP4) and Versatile Interface Processor card (the VIP2-15) for the 7500, new port adapter modules for both the 7500 and 7200, and a new network processing engine for the 7200.

The RSP4 can boost performance by 40% to 50% for most protocols, Cisco said. And the VIP2-15 offers nearly twice the static RAM capacity of its predecessor, the VIP2-10, enabling it to support higher speed, higher density port adapter modules, the company said.

The company rolled out several such port adapters for the 7500 and 7200, including — at long last — a 100VG-AnyLAN card (see graphic, page 6). Cisco also intends to ship Gigabit Ethernet and 622M bit/sec ATM OC-12 interfaces for its high-end routers in 1998.

In addition, Cisco unveiled a new processor for the 7200, which is one designed as a less costly alternative to the router's current CPU.

The new NPE-100 weighs in with 100K packet/sec of performance and 2M bit/sec of bandwidth. Its predecessor, the NPE-150, forwards 150K packets/sec and features 6M bit/sec of bandwidth.

©Cisco: (408) 526-4000.

## Browsers

master for the Federation of American Scientists. "It would be a good thing if everyone was allowed to catch up to 1996 before we fast-forward to 1998."

Pike expects he will have to rebuild his 6,000-page Web site to accommodate new browser elements. "I'm in no hurry to tackle that challenge, and I want to have a real clear understanding of the lay of the land before I start," he said.

Many companies are not even standardized on one browser version. For instance, only 45% of the browser users at TRW, Inc. of Cleveland, are using Navigator 3.0. The rest have earlier versions.

And the company has no plans to implement the new Navigator features until the commercial release is ready.

"While we're looking forward to layers and style sheets, we're not going to be out of pocket or harmed in any way by their delay," said Neil Fox, TRW's manager of advanced development and applied technology. But product delays are

not without consequence.

For instance, Corel Corp. said it will not be able to include components of Netscape's new Communicator groupware client with the initial release of its WordPerfect 8 suite, due out in the April to May time frame. Company officials said they will

**The Communicator client** *includes E-mail, collaboration tools and Web authoring functionality.*

stick to that schedule and offer a special price on the Communicator-enhanced version when it is ready.

Corel's Office Professional also is slated to feature Communicator components, but that is not expected to be released until June or July.

Although Netscape declined to specify the month that Communicator will ship, Corel officials said they have been told to

expect June commercial availability.

Netscape's reaction? "My developers believe that they're going to beat that," said Daniel Klaussen, group product manager for Communicator.

Klaussen said he expects the product to ship earlier in the quarter rather than later. "However, once we get closer to knowing exactly the state of the software, we'll have to make that decision," he said.

Netscape last summer said the final version of its groupware-enhanced browser would be ready by year-end, but by October, the company pledged only a beta before 1997. A feature-incomplete beta for Windows 95 and NT hit the Web on Dec. 23, 1996, but company officials took pains to refer to that version as a "preview release."

Arch rival Microsoft in mid-July promised a year-end release for its Internet Explorer 4.0 beta. That is still not out yet. It is due by the end of March, with the final product out in midsummer, according to Yusuf Mehdi, group product manager.

He said the primary reason for the delay is the decision to include dynamic HTML technology, code-named Trident, in Internet Explorer 4.0. ■

## Netscape sweetens SuiteSpot servers

**N**etscape Communications Corp. this week will begin beta-testing an update of its Enterprise Server, the best-selling element of its SuiteSpot server line.

New features in Version 3.0 include:
● Enhanced Web publishing capabilities, letting users post documents to the server in their native formats (including Microsoft Corp.'s Word and Excel), keep track of different document versions (thanks to technology supplied by Mortice Kern Systems), and specify who can edit and view documents.
● Server-based intelligent agents that can be configured to notify users via E-mail that documents have been updated.
● Beefed-up full-text search capabilities, employing Verity, Inc.'s Search 97 engine.
● Administration tools that permit managers to

take the configuration from one server and distribute it to others.
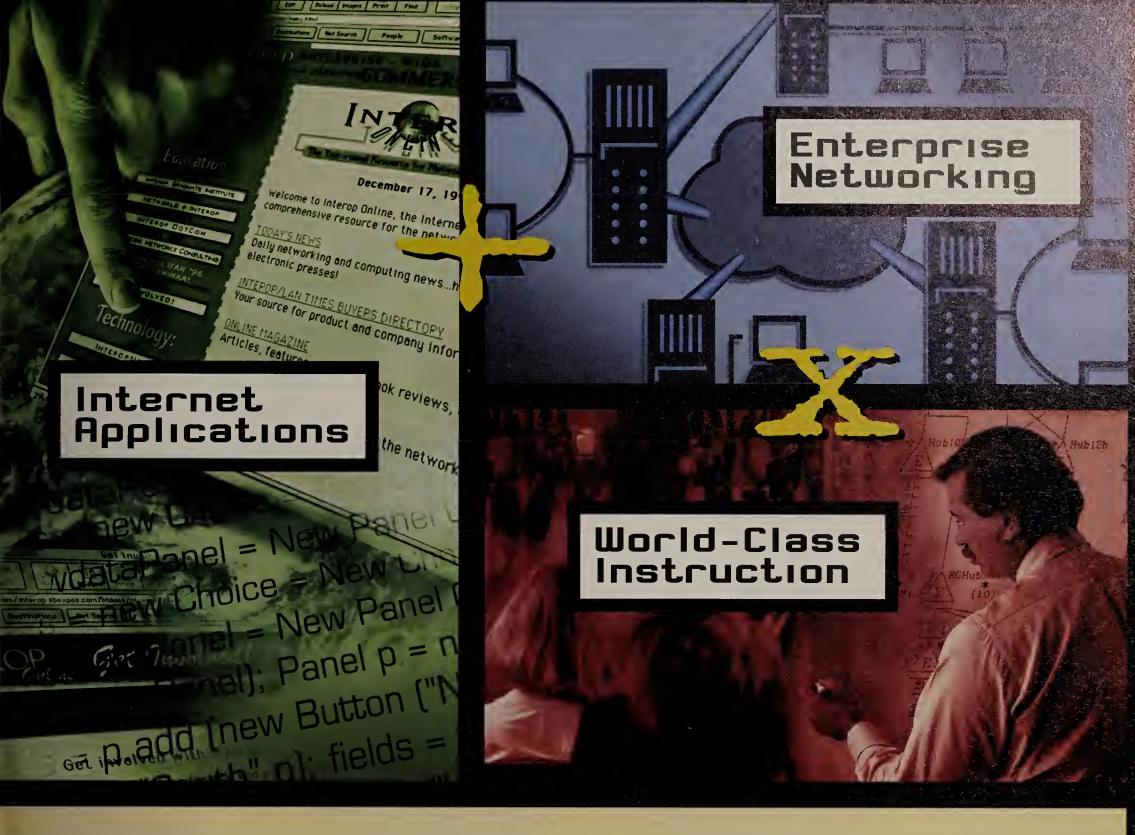
"It certainly meets expectations and, in some ways, exceeds them," said David Smith, research director of Internet strategies with the Stamford, Conn.-based Gartner Group, Inc. consultancy.

"What's not met expectations, necessarily, is that it looks like it might not make the first quarter," he said.

Netscape officials said the product will ship at the end of the first quarter or beginning of the second, depending on the feedback they receive.

The initial beta will be available for download this week from Netscape's Web site for Windows NT, Solaris, IRIX and HP-UX.

— *Carol Sliwa*

# Backspin

# Did you know. . .? Facts, and facts about managing facts

*Fact 1: The average dentist spends approximately two years of his or her career waiting for their patients to spit.*

I love facts. And I really love to find facts that I'm looking for exactly when I need them (although, like all real guys, while I can find obscure data online, just ask me to find something in my own house).

*Fact 2: Every time you lick a stamp, you consume approximately 0.1 calories.*

For example, I keep snippets of all sorts of documents I come across and the vast majority of my E-mail. And it is amazing how often I've found some vital piece of information in my E-mail archives.

*Fact 3: The longest recorded flight of a chicken is 13 seconds.*

Just today I was able to find an obscure press release in a matter of seconds when I needed it *while* I was talking on the phone. Did I sound good, or what? "Oh sure, I have something on that. . .Ah, yes, here it is."

*Fact 4: A "jiffy" is a real unit of time equal to 0.01 of a second.*

> *As our organizations' data resources become more complex, the cost of maintaining the integrity of more than one copy of the data will become tremendous.*

In corporations, it is interesting how much information is duplicated over and over again. This happened because we didn't have the tools or communication services to do anything else.

*Fact 5: The word "samba" means to rub navels together.*

Over the last, oh, I guess almost a decade, we have recognized this problem and its implications with respect to databases. We now seek to "normalize" data in databases by removing repeated fields.

*Fact 6: Clans of long ago that wanted to get rid of their unwanted people without killing them burned their houses down. Hence the expression "to get fired."*

In the future, we need to do the same thing with all the data and information in our organizations, not just databases.

*Fact 7: Companies lose half their employees every four years, half their customers every five.*

This matters because, as our organizations' data resources become broader and more complex, the cost of maintaining the integrity of more than one copy of the data will become tremendous and the dangers of erroneous data floating around the organization will become unacceptably high.

*Fact 8: When Captain Cook landed in Australia, he asked an aborigine what those strange creatures with the big feet were that kept hopping by. The native replied, "kangaroo." And thus, they were named. Turns out that kangaroo in the aborigine language means "I don't know."*

So how will we achieve this goal? Well, the key technologies will be the World-Wide Web and hypermedia. Rather than sending 1,000 users an electronic copy of a long memo, send them a link to a master copy prefaced with a summary.

*Fact 9: The phrase "rule of thumb" is derived from an old English law that stated you couldn't beat your wife with anything wider than your thumb.*

Then, if the data is relevant to the users, they can go across the corporate intranet and browse the single, current, accurate master copy. And if it needs updating, no problem. There's only one copy, and the users can be sent a link to the changed section.

*Fact 10: The very first bomb dropped by the Allies on Berlin during World War II killed the only elephant in the Berlin Zoo.*

Of course, the users will have to learn not to keep copies of every piece of data you point them to (just consider how they download everything they see in every Internet file archive with wild abandon).

*Fact 11: More people are killed annually by donkeys than die in air crashes.*

So will companies start to think this way? Probably not for a while. It's a well-known fact that you can lead a horse to water, but you can't make it drink.

*How much data do you have? Send facts via E-mail to mgibbs@gibbs.com or phone (800) 622-1108, Ext. 504.*

Mark Gibbs

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**OLD GUYS FINISH FIRST** Internet IPO watchers could be forgiven for overlooking the ticker debut last week of **Template Software, Inc.** After all, Template defies the Internet IPO archetype in three big ways: 1) the company has been around awhile – since 1978; 2) none of its executive officers were born after The Beatles broke up, and; 3) it actually makes a profit.

Template, based in Dulles, Va., is an object-oriented tool and application vendor that now integrates Web technology into its enterprisewide products, including the Web Template and the System Management Template. It made a net profit of $726,000 on revenues of $9.6 million through the first three quarters of 1996.

Not bad for a bunch of old guys.

The common stock is trading on NASDAQ under the symbol TMPL. Opening price for the 2.1 million shares was $16 per share. Underwriters are Volpe, Welty & Co. and Piper Jaffray, Inc.

**EPOCH EYES ISPs** **Epoch Networks, Inc.** has announced a $23 million round of equity financing, which will be used primarily to fuel the national ISP's drive to expand into major metropolitan markets by devouring regional ISPs.

Investors in this second round of Epoch financing include **Hancock Venture Partners, CIBC Wood Gundy Capital, Providence Equity Partners** and **Prime Ventures.**

Last year, Epoch purchased regional ISPs in Virginia and Atlanta.

Since its founding in 1994, Epoch has built up a business-to-business customer base of 1,100 companies, along with 40,000 individual subscribers. Located in Irvine, Calif., the company was formerly known as HLC.Internet, Inc. And before that, it was known simply as Prince.

**IF IT'S FREE, IT MUST BE MAGIC** Companies looking to reduce faxing costs can now download a new product from **Clarity Software, Inc.** that allows them to send faxes over the Internet to anywhere in the world for free.

MagicFax uses the Web to route the fax from the sender to a Web server nearest the intended recipient. That Web server then sends the information to a fax machine or fax modem, or routes it through electronic mail to another MagicFax user.

Of course, not everything is free. Add-on modules for MagicFax that allow advanced fax management functions run from $600 to $900 per server. The product is available now for Unix and Windows 95. A version for Windows NT is available in beta from Clarity's Web site.

Clarity is located in Mountain View, Calif.
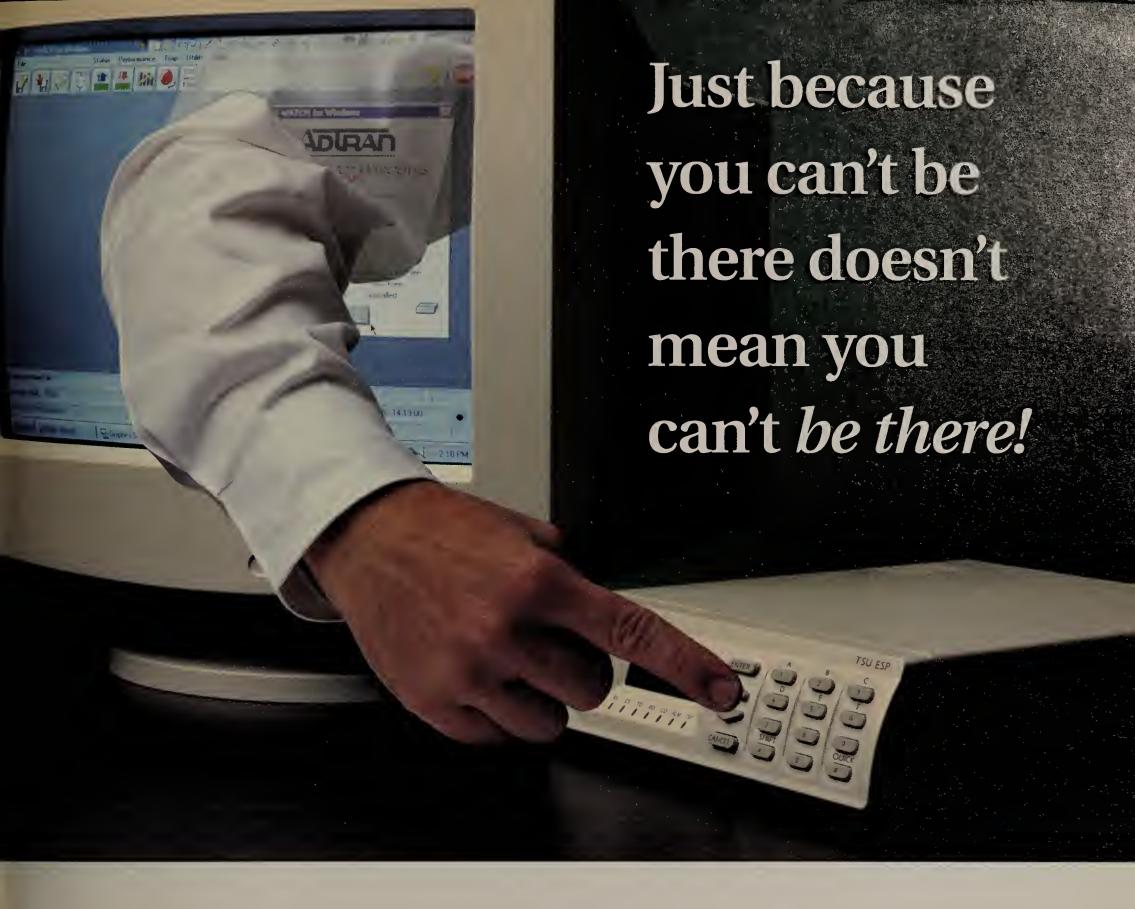
**BUT IF IT'S GENERAL MAGIC, IT MUST BE BAD NEWS** Last week's layoffs at Internet vendor manqué **General Magic, Inc.** is merely the latest in an almost unprecedented run of disasters for the Sunnyvale, Calif.-based company.

General Magic repositioned itself last summer from a money-losing software company to a money-losing Internet software company. Since September, General Magic has cut its workforce from 280 to 138 jobs and its stock has fallen to less than $2 a share.

Where did the company go wrong? According to a Silicon Valley venture capitalist, the problems began, well, in the beginning. "From Day One, the founders couldn't agree on a cohesive strategy, so the company was all over the map. It never had a focus, a direction."

*'Net Buzz has always been known as 'Net Buzz, except for when we were in the federal witness protection program and were known as The Love Machine. You can call us anything you want, as long as you send us your most dangerous Internet and intranet news, gossip and innuendo. Contact Chris Nerney at (508) 820-7451 or cnerney@nww.com.*

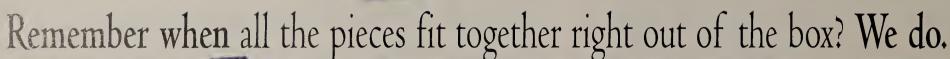# Just because you can't be there doesn't mean you can't *be there!*
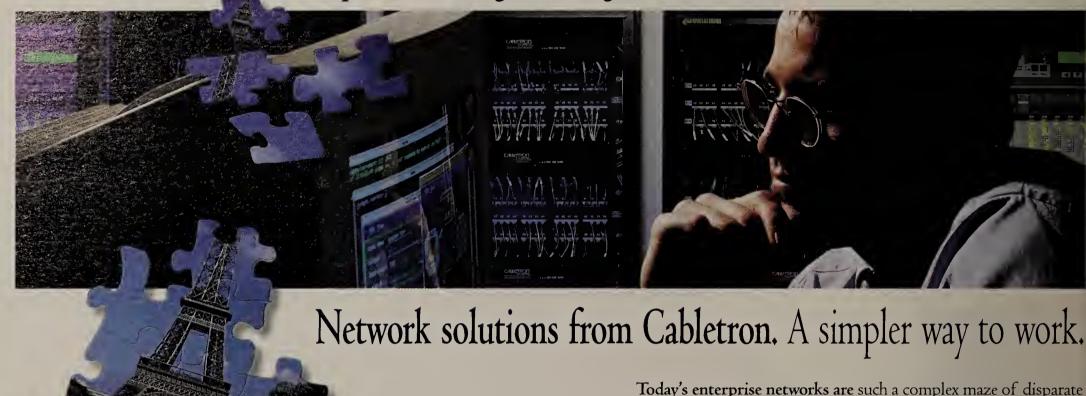
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